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April 11, 1949

STEEL

The Magazine of Metalworking and Metalproducing

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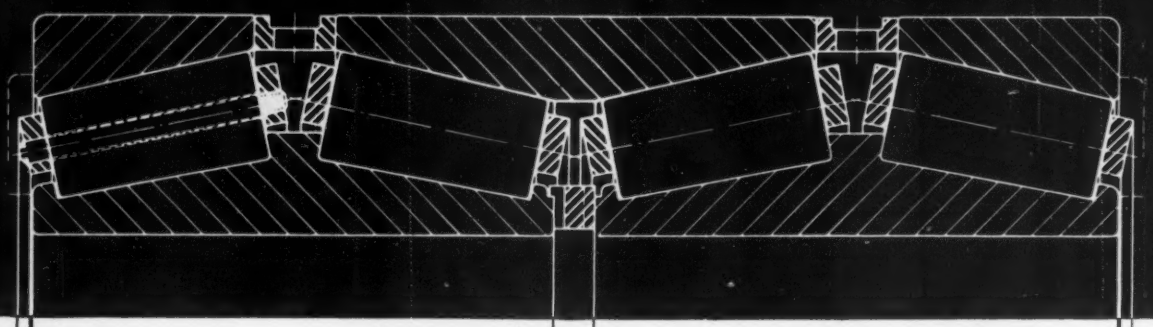

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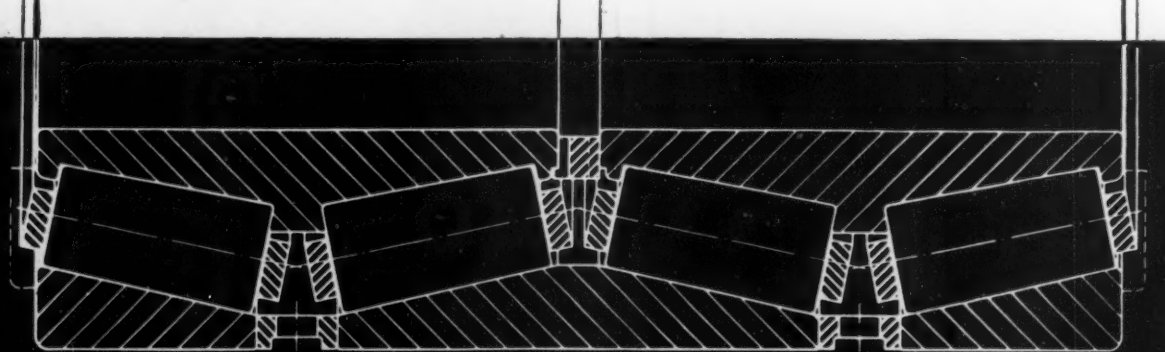

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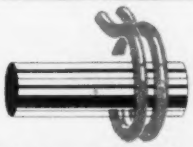
2 Stock: S. A. E. 1060 annealed for machinability.

3 Machine to 1.3780" diameter, except shoulder 3/32" wide and .111" high. .736 lb. of metal removed.

4



5 Induction harden shoulder to Rockwell C 62.

6 Grind shaft both ends.

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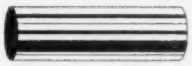
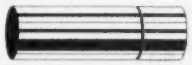


1 Start with 1.3780" round, 4½" long. Weight 1.89 lbs.
Saving .75 lb.

2 Stock: S. A. E. 1060, turned and ground.



3 Machine groove .105" wide and .045" deep. Approximately .004 lb. of metal removed. .732 lb. less metal to remove.
Note saving of machining.

4 Assemble ring in groove.
A simple operation.

5 Ring already hardened.
No heat treating necessary.

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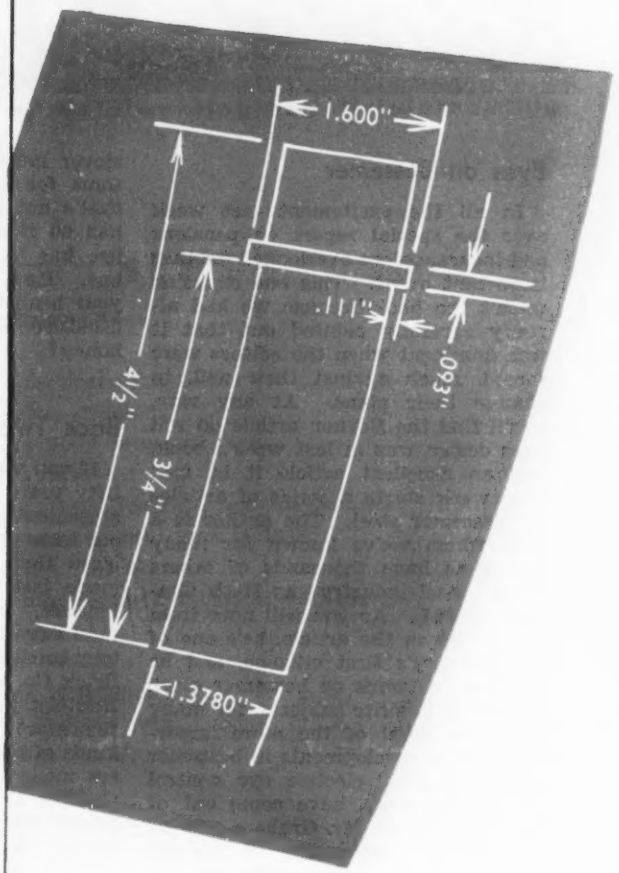
Assembly has ultimate shear strength of 37,000 lbs., when snap ring and shaft are of the same hardness. Will withstand pressures in excess of 5000 lbs.



are there any *Savings like this* in your product?

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Folder 43 offers many helpful suggestions for the profitable application of Reliance Snap Rings on products of all kinds. Write for a copy.

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Behind the Scenes...

Eyes on Bessemer

In all the excitement last week over the special report on pensions and insurance, we overlooked another important event. This one omission wasn't too bad—because we had already carefully pointed out that it was imminent when the editors were forced, much against their will, to change their plans. At any rate, you'll find the Beynon article on roll pass design was in last week's book, and an excellent article it is, too! This week starts a series of articles on Bessemer steel. The author is a man whom we've known for many years—as have thousands of others in the steel industry—as Herb Graham of J&L. As you will note from the byline on the article, he's one of the industry's first citizens, and he has been at work on bessemer steel, one of his favorite subjects, for many years. Several of the more important recent developments in bessemer steel, including electric eye control of the converter, have come out of the workshop of Mr. Graham and his associates. This series of articles will reflect not only interest but also love of the subject—a series very much worthy of inclusion in our Fundamentals of Steelmaking series.

Stop Laughing

Last week we roared, chuckled, guffawed and tittered, as one should always do during National Laugh Week. This week we are sobering up a bit, putting on a straight face and looking earnest in honor of National Sunday School Week. It is also Pan American Week, and at least part of it is National Want-Ad Week and Honey-for-Breakfast Week. If we were real clever, we might be able to mix all those together and get an interesting combination.

Take It Easy

Are you tired after a day's work? Do you feel that you are being crushed under the weight of your duties? Did your best stenographer just leave to get married? Do you wish you had three or four more arms and a couple of extra heads just to get your work done? Well, relax. Consider the hard labor performed by others and rejoice at your lot. Take the bee, for instance. A red clover blossom contains less than 1/8th of a grain of sugar; 7000 grains are required to make a pound of honey. A bee flitting among the clover must visit 56,000 clover blossoms for a pound of honey — and that's not all. Each clover blossom has 60 flower tubes on it, and the bee has to poke his face into each one. How would you like to stick **your** head in and out of a pink tube 3,360,000 times, all for a pound of honey?

Back Two Score Ten

If you were a reader of advertising fifty years ago, and you checked the statements made by advertisers in our issue of April 13, 1899, you would learn that Cahall boilers are better made, last longer, cost less for maintenance, and make drier steam than any other kind; that the refractory brick made by the Webster Fire Brick Co. is the best on earth; that Bristol's patent steel belt lacing is the most perfect fastening for all kinds of belting; that the pipe cleaners made by the Union Boiler Tube Cleaner Co. have set the acknowledged standard of the world; that Apollo Best Bloom Galvanized Steel will do everything (that was before Duz, of course); that Millett's patent core oven is the best in the world; that Brier Hill Portland Cement is the best and the cheapest. Superlatives, it seems, are not new—they've been there all the time!

Puzzle Corner

The income tax of two weeks ago was $127.30 on $1273. One of our Chicago friends points out the fallacy of buying expert advice on income tax —he says the boy would have saved some cash by using the table on page 4 of the tax blank, but of course that would have ruined the problem! This week, we have a guaranteed "oldie" for you. This one could just as well run in our department of fifty years ago, since it was about that long ago the country was agog over it. Sam Loyd first asked the question, "How old is Ann?" and people have been figuring it out ever since. The puzzle asks, "The combined ages of Mary and Ann are 44 years, and Mary is twice as old as Ann was when Mary was half as old as Ann will be when Ann is three times as old as Mary was when Mary was three times as old as Ann."

Shrdlu

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STEEL

Vol. 124—No. 15 April 11, 1949

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Published by THE PENTON PUBLISHING Co., Penton Building, Cleveland 13, Ohio, E. L. SHANER, Chairman and Treasurer; G. O. HAYS, President; R. C. JAENKE, Vice President; F. G. STEINEBACH, Vice President and Secretary; E. L. WERNER, Assistant Treasurer. Member, Audit Bureau of Circulations; Controlled Circulation Audit, Inc.; Associated Business Papers Inc., and National Publishers' Association.

Published every Monday. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $18. Single copies (current issues) 35c. Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879. Copyright 1949 by the Penton Publishing Co.

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Plastic Flow in Forming And Drawing Metals

Production of Bessemer Steel—Part II

STEEL

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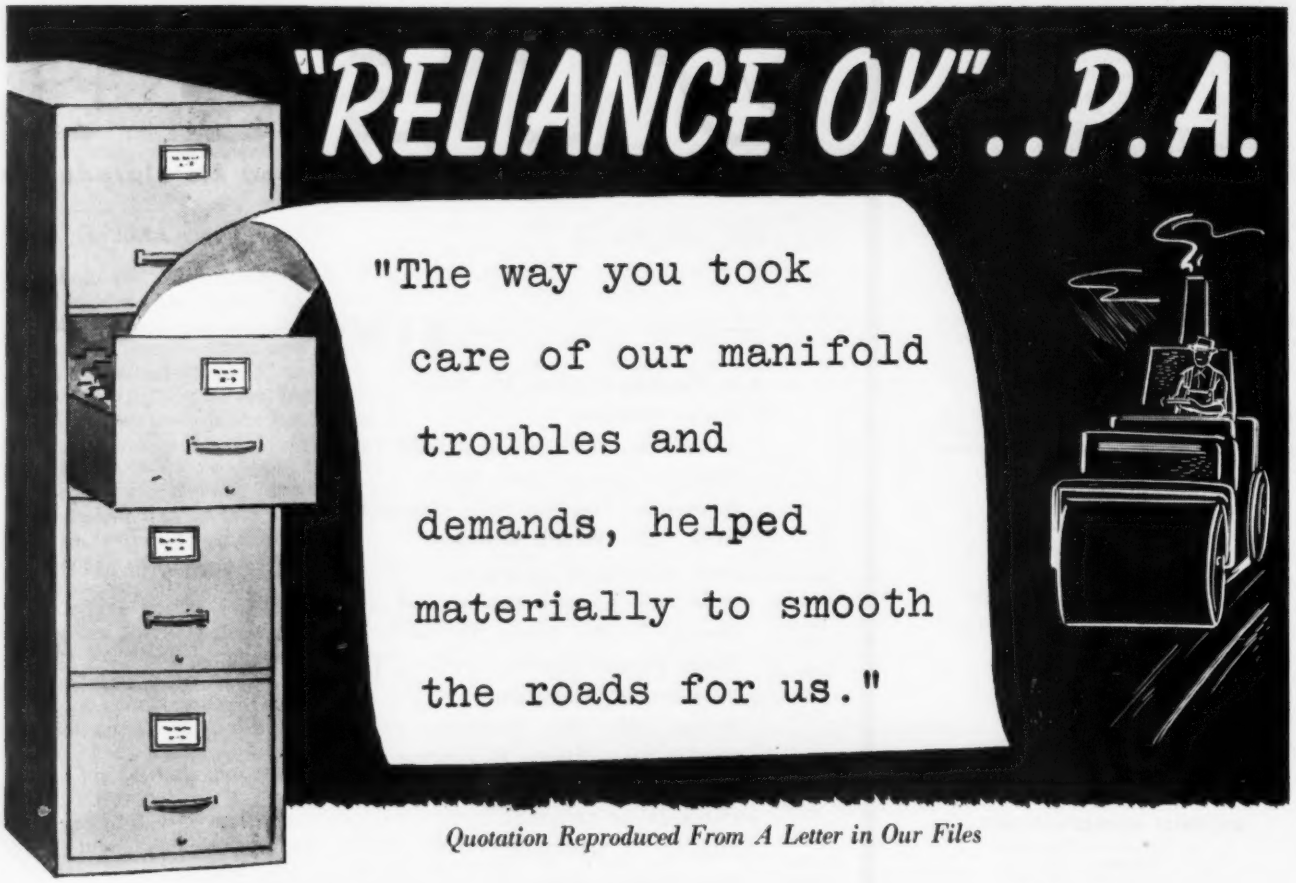

Quotation Reproduced From A Letter in Our Files

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Here is Reliance Service in action from the P. A's angle . . . in his own words.

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April 11, 1949

Flimsy Pretexts

If the consequences were not so serious, the ease and alacrity with which the Truman administration shifts from one pretext to another to justify huge government expenditures would be amusing. The latest example of nimble acrobatics is found in the administration's attitude in regard to government participation in the steel business.

When the President, in his message to Congress in January, first proposed that the government get into steelmaking, he did so on the pretext that the nation was sorely in need of more capacity. He urged that a study of steel requirements be made and suggested that if this study showed that more capacity was needed, then the federal government should provide the necessary capacity if private industry was unable or unwilling to do so.

The study was not made, although bills authorizing the Reconstruction Finance Corp. to lend federal funds to private or public agencies for plant expansion were introduced. However, since January the supply of steel has been catching up with demand so rapidly that it now would be absurd to seriously consider building a government-financed steel plant to provide adequate capacity. Washington probably would be condemning the excess capacity of the steel industry before the plans for a new government steel plant could be drawn.

Strangely, this does not dismay the Trumanites one whit. They have another pretext ready. They are thinking about proposing that Mr. Truman ask Congress for authority to build steel plants at government expense, "possibly to be held as a standby in case of emergency." They talk glibly of plants with an annual capacity of 10 million tons, costing $3 billion, to be operated by private parties.

This agility in the case of steel is adaptable to any other expenditure the administration should wish to justify. If the Truman demand for authority to spend for this or that "to combat inflation" is weakened by the clear-cut fact that inflation is giving way to deflation, it is an easy matter to change the wording and ask for the same authority "to combat deflation."

Such tactics are an insult to the American people. Mr. Truman last November was not given a mandate to spend the nation into bankruptcy on flimsy pretexts.

* * *

SHOE IS ON OTHER FOOT: Current news items indicate how quickly the shift from a sellers' to a buyers' market can cause individuals to change their minds and companies to reverse their policies.

Not long ago the howl about the alleged inadequacy of steel ingot capacity was terrific. Last week a report from the West Coast stated that the shifting pattern of steel supply and demand in that area " is bringing about a reappraisal of the immediate and long-range future of the West's newly acquired basic steel industry" and that if demand, which is now beginning to level off, declines substantially in the next year or two, "western steel mills may find they have an excess of producing capacity."

As recently as mid-January, many customers remote from mills were complaining bitterly that they were being abandoned by sellers who had served them faithfully for decades. Comment on this page in the Jan. 24, 1949, issue was as follows: "To many customers this situation looks pretty serious. It is serious—right now. However, no supplier of anything, in his

(OVER)

right mind and in a buyers' market, ever turned down business when he needed it. No matter what pricing system prevails, when the going gets tough the mills will be around to prospective customers—near and far—with hats in hand, begging for orders."

Today, less than three months later, reports from many areas indicate steel sellers now are busy trying to rewin the favor of distant customers they abandoned. This is a complete "about face" in record-breaking time.

—pp. 55, 56

* * *

POOR TIMING ON SCRAP: Current idiosyncrasies of the scrap situation defy description. Almost every new development adds new complications to an already badly muddled market.

Consider these disconcerting facts. Prior to Pearl Harbor we were shipping tonnages of scrap to Japan in accordance with a government policy of appeasement. After VJ-Day in 1945, when we needed scrap badly, we were told there was a negligible tonnage of economically usable scrap in the Far East. Today, when scrap prices are at the lowest ebb in years, when mills are out of the market and when scrap from many sources has been accumulated during a mild winter, the latest mission to Japan tells us there are 5 million tons of the material in the Nipponese islands.

Similarly there appeared to be little scrap available from Europe until our acute need for it had passed. The timing on scrap seems to be consistently unfortunate. —pp. 53, 127

* * *

FARMS OUT LESS WORK: One of the results of the present economic adjustment is a noticeable curtailment of subcontracting. Many large manufacturers who have been farming out substantial quantities of work now find their own capacity adequate and are pulling in jobs formerly sublet to outside shops.

The tendency to withdraw work from subcontractors does not apply uniformly to all industries. So far little change is noticeable in the amount of work farmed out by the automobile, aircraft, farm equipment, steel mill equipment and a few other heavy industries. The subcontractors who have been hit hardest are those who perform work for manufacturers of road building and construction machinery, railroad equipment, textile machinery, heavy trucks, office equipment and appliances.

As industrial operations become stabilized at a lower price level much of the work that has been withdrawn from subcontractors will be restored to them. In the long pull the work will go to whoever can do it satisfactorily at lowest cost. —p. 54

* * *

MORE BUILDING IN 1949: Government authorities continue to be confident that the volume of new construction in 1949 will exceed that of 1948 by about $1 billion. A joint estimate by the Department of Commerce and the Department of Labor places total new construction this year at $18,800 million compared with $17,775 million last year.

It is estimated private construction in 1949 will total $13,750 million, a slight increase over 1948. According to the forecast, residential construction, both urban and farm, will be off moderately. A minor drop in industrial construction will be more than offset by increases in commercial buildings, schools, churches and hospitals. Although railroad construction is expected to remain at the 1948 level, the volume of other public utility building will increase.

Publicly financed construction in 1949 is expected to total $5,050 million, as against $4,040 million in 1948. The increase is accounted for chiefly by larger expenditures for institutions, highways, sewer and water projects and conservation programs. —p. 57

* * *

THIS PIONEERING PAID: For more than 10 years Ford Motor Co. has been developing a hot extrusion technique for forming certain automotive parts. Much of this work has been concentrated on the problem of producing front wheel spindles for passenger cars. At first extruded spindles were turned out in a pilot plant and later on in a permanent installation.

The results have been highly satisfactory. Compared with the previous method of forming spindles, the extrusion process saves 30 per cent in steel, 80 per cent in floor space, 40 per cent in die costs and 65 per cent in labor. Whereas 46 men were required previously, only 16 are required under the extrusion method. Also the extruded spindles are stronger because the fiber flow in the metal approaches ideal conditions. —p. 82

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

SCRAP COLLAPSE— Iron and steel scrap prices have dropped nearly 50 per cent in the past three months, while steel mill production has been holding at near practical capacity (p. 53). Heavy melting steel now can be obtained at near OPA price levels, and offering prices in some remote areas are below the controlled prices of wartime. Contributing to the demoralization of the market are the virtual disappearance of conversion steel demand, increased imports, large inventories accumulated by the mills and the restoration of the normal scrap cycle. Traders are hoping that buyers soon will enter the market, but many mills indicate they will not buy any substantial quantities this month.

WITH HATS IN HAND— Steel salesmen again are soliciting business (p. 56). Some are re-entering remote areas from which they withdrew only a few months ago. In a few instances, mills are reported to be equalizing freight to meet competition, although generally the full freight is being charged the buyer.

SUBCONTRACTING—Softening in demand for many goods has caused some large manufacturers to pull back work which they have been farming out to other companies (p. 54). Shops which depend largely on subcontracting work often have been hard hit, especially those supplying the appliance makers, some electrical equipment manufacturers, office machinery, oil country goods, textile machinery and other lines in which the slackening has been pronounced. The automotive industry, with its 50,000 suppliers, shows little inclination to change its subcontracting setup, although pressure is being put on suppliers to reduce prices.

PAPA KNOWS BEST?— Industrialists again are turning questioning eyes toward Washington. Many believe that the continued fear of inflation being expressed by administration spokesmen (p. 60) indicates a lack of understanding of the facts of the economy. At the same time, most businessmen do not fear a serious recession and believe the current easing in demand and prices may be a healthy development.

CAPITAL OUTLAYS—Decline in expenditures for new plant and equipment during the latter part of 1949 is indicated by a survey just completed by the Department of Commerce (p. 65). A drop of 14 per cent is forecast for the second half, compared with 1948. Expenditures for the year are estimated at $18.3 billion, compared with 1948's record breaking $19.2 billion.

CONSTRUCTION— New building is expected to exceed that for 1948 by about $1 billion the Commerce Department estimates. Private construction will be about the same as 1948 and public works will account for the increase (p. 57).

BRITISH STEEL EXPANSION— New construction and modernization by the British steel industry is reaching large proportions (p 64). Primary capacity will be increased to 20.7 million tons within the next four years. Pig iron capacity will be raised to 14.5 million tons. Iron ore and coke capacity will be similarly lifted. A detailed listing of improvements and modernization underway and projected will be found on page 64.

HERE AND THERE IN INDUSTRY— Automobile output in March reached a 20-year record at 544,388 units, exceeded only in March, 1929 (p. 68) . . . Price reductions are sweeping through the auto industry like a spring breeze (p. 67), and further cuts are anticipated . . . Britain's Labor government is halting its $100 million subsidization in the steel industry; action may swing more support to the nationalization program (p. 63) . . . Borg-Warner will spend $5 million this year to complete a $40 million, 4-year expansion program (p. 70). . . In the face of declining steel demand, Ohio Stainless & Commercial Steel Co. is expanding by opening a Detroit warehouse (p. 70) . . . Allocations of steel for ECA and federal reclamation programs have been approved (p. 57) . . . A veiled appeal for industrial support for the State Department's science staff in London is heard from Washington (p. 62). . . Standardization of screw threads was the principal topic at last week's meeting of the National Screw Machine Products Association (p. 58).

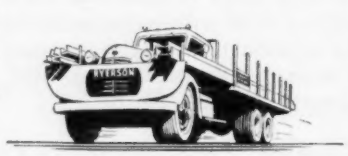
ENOUGH STEEL?

The Time to Watch Inventories May Be Now

Informed opinion holds that the time may be near when industry must again show caution in the control of steel inventories. In fact, for some types of steel that time has already arrived.

It's all too easy for this important fact to escape notice until too late. Because of abnormal demand the problem of excess steel inventories has been no problem at all for several years. Now there are signs of a change. The situation is still uncertain and some steels remain critical. But when the turn comes, even today's "normal" inventories may loom large.

As warehouse stocks improve, you can safely extend a conservative buying policy over an increasing variety of steel requirements. Warehouse stocks serve as your steel inventory reserve, allowing you to keep your own inventory at a practical working level. Thus you avoid the continued tie up of capital and minimize the risk of an inventory loss.



The Ryerson organization is particularly well equipped to work with you in keeping your inventory streamlined. Each of thirteen Ryerson plants has large stocks of carbon, alloy, and stainless steels in spite of some unbalance from a size standpoint. Each is served by high speed cutting and handling facilities—and staffed by experienced steel men.

So don't let changes in product design or market conditions catch you with your inventory too high. Steel overstocks can easily become an expensive luxury. We suggest you watch your inventories and keep in touch with us for your current requirements.

Joseph T. Ryerson & Son, Inc. Plants at: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles, San Francisco.

RYERSON STEEL

STEEL
A PENTON PUBLICATION

Scrap Drops to Near OPA Levels

Collapse of market unique in face of sustained record steel production. Increased imports, decline in conversion steel demand, resumption of normal scrap cycle cited as causes

NEVER before in the face of sustained high steelmaking operations has there been the collapse in the scrap market which has occurred in the past three months.

Steelmaking grades at leading production centers have dropped about $20, or nearly 50 per cent, since the turn of the year. Prices now are down to almost the OPA level prevailing during and immediately after the war. If increased freight and labor costs are taken into consideration, offering prices in remote areas are below those of wartime.

With the market becoming more demoralized day by day, traders believe that only the simultaneous reentry of large buyers would halt the downward trend. Steel mill inventories generally are substantial and some mill buyers indicate they will stay out of the market through April.

Secretary of Commerce Charles Sawyer last week called off the government-sponsored scrap campaign.

What Caused Break?—Scrap traders frankly are puzzled by the sharp break in the market while steel mill production continues at near-record levels. Analysts cite four major contributing causes:

1. Virtual disappearance of demand for scrap for conversion ingots.
2. Increased imports from Germany and Japan.
3. Restoration of the normal scrap cycle.
4. Accumulation of large inventories by the mills last winter.

During the height of the postwar steel scarcity, steel-hungry consumers turned to conversion steel to obtain needed supplies. Premium prices were offered freely for scrap to be converted into ingots. With the easing in steel supplies, premium-priced conversion steel rapidly is fading out of the picture.

Imports of scrap have been increasing steadily since last fall. In January, nearly 150,000 tons came in, double December imports. This tonnage has helped to tip the balance.

Nearly four years of record-breaking production by this country's metalworking plants has served to reestablish the normal scrap cycle which was broken during the war. Between 110 and 125 million tons of steel and equipment made of steel were shipped abroad. Normal scrapping of steel goods was halted due to difficulty of obtaining replacements.

Steel mills last winter had heavy backlogs of orders, apparently faced a long period of high production. They purchased large stocks of scrap. An open winter permitted continued collection, preparation and shipment of material to consumers.

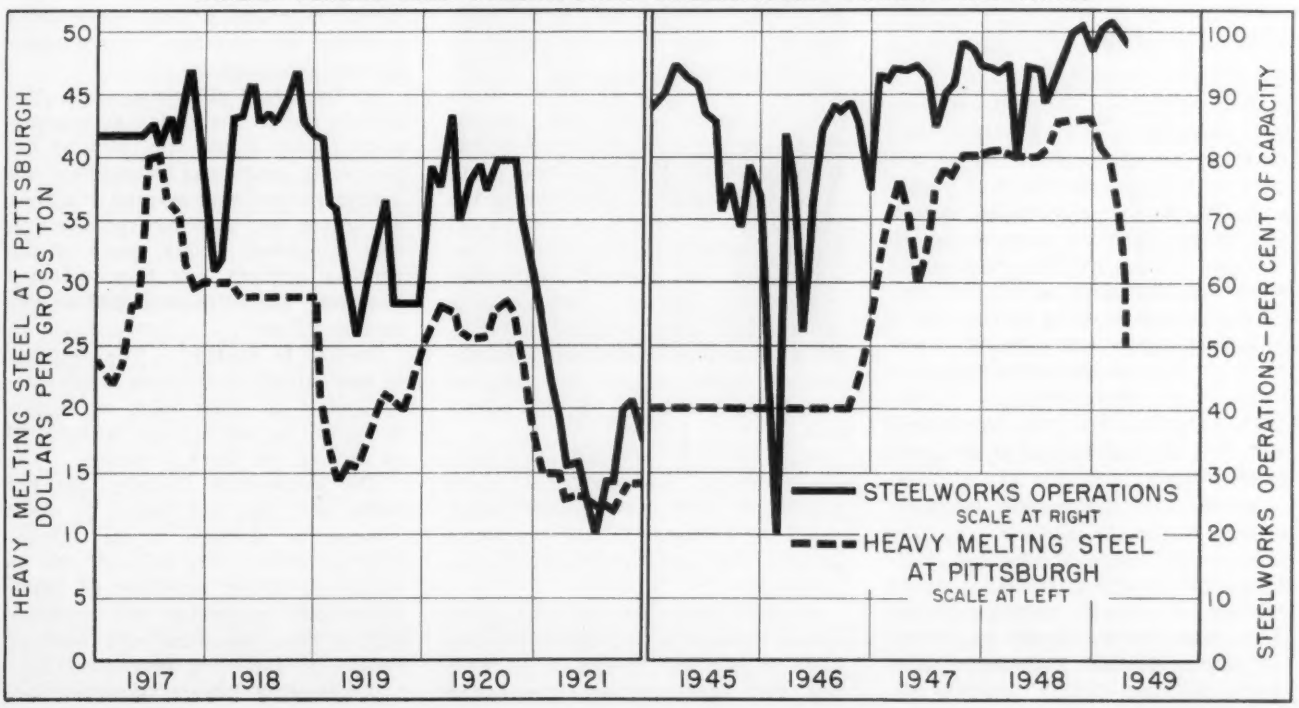
Some Dealers Lose—The rapidly falling market has played havoc with some dealers who were caught with high-priced material. Some losses ran into five figures last month.

Scrap traders have been warning the mills that continued downward pressure on prices will cause the scrap collection machinery to break down. Although scrap supplies currently are ample for current needs, the long-term outlook is not too bright, especially in event of another war emergency.

Scrap Stockpiling Studied

STOCKPILING scrap iron and steel for use in a possible future emergency will be discussed at a meeting of the scrap subcommittee of the Munition Board's Iron & Steel Industry Advisory Committee in Philadelphia Apr. 21. Recommendations of the subcommittee, of which

SCRAP PRICES AND STEELWORKS OPERATIONS—AFTER TWO WARS



R. W. Wolcott, president, Lukens Steel Co., Coatesville, Pa., is chairman, will be turned over to the Munitions Board, which could create a scrap stockpile through the Bureau of Federal Supply.

Proponents of a scrap stockpile for emergency use are found in the steel, foundry and scrap industries and in the government. They point out that in the initial period of a war emergency, scrap production is halted in the conversion from peacetime to war production, and that scrap stocks might then drop to a dangerously low level.

The proposals to build a scrap stockpile contemplate the use of imported scrap, from Germany and possibly Japan. Creation of a stockpile thus would not interfere seriously with the domestic market.

One question to come before the subcommittee will be the type of scrap to be stockpiled. The aim is to stock carbon scrap, free of alloy contamination so that it can be used to produce any desired steel compositions.

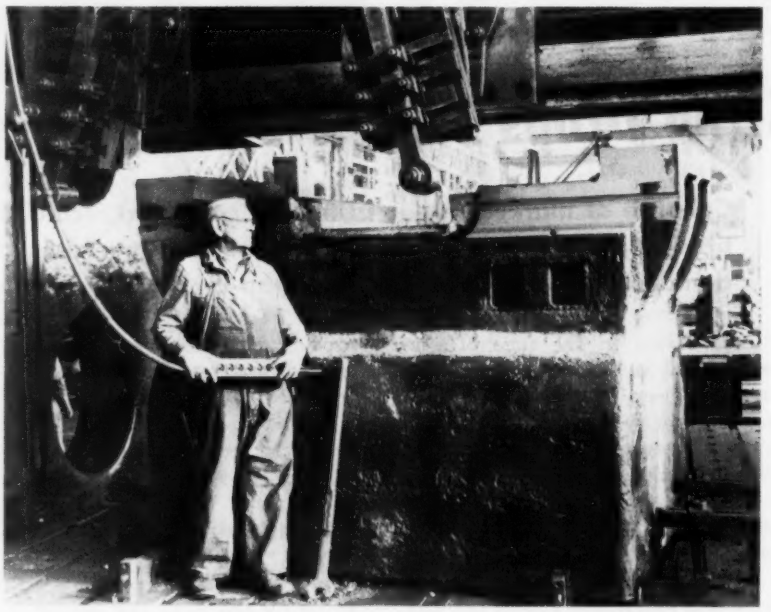
Scrap from Japan?

HISTORIC movement of scrap from this country to Japan may be reversed. Actual supplies of iron and steel scrap in Japan are estimated at 5 million metric tons, five or six years' supply for the Japanese industry. Export of a substantial tonnage of open hearth grades is practical and would not impair the domestic economy of Japan.

This is the conclusion of a four-man mission on scrap which visited Japan in December at the request of Secretary of Commerce Charles Sawyer to study the availability of scrap in that country.

Commenting on the mission's report, Secretary Sawyer said: "Contrary to previous reports, there appear to be large quantities of usable scrap in Japan, a substantial portion of which could be shipped to the United States. While supplies of scrap in this country at the moment are ample, steel production is still running at capacity rates and there is not an excessive supply in event of an emergency. . . . I hope that some method can be devised for the stockpiling of high-grade steel scrap."

Members of the mission included: George Sturm, David J. Joseph Co., Cincinnati; Marshall Shapiro, California Metals Corp., Oakland, Calif.; William G. Walk, Carnegie-Illinois Steel Corp., Pittsburgh; and Ronald Scott Coulter, Bethlehem Steel Corp., Oakland, Calif.



SOW BLOCKS: Forty-five-ton anvil base is shown being reconditioned at the Sunnyvale, Calif., plant of Westinghouse Electric Corp. The block, a steel casting, is used for drop forging of large steel billets at the American Forge Co.'s Miles, Calif., plant. Sunk into the ground and with an anvil mounted on top of it, block takes the repeated blows of a 5000-pound steam drop hammer

Subcontractors Feeling Pinch

Large manufacturers farming out less work as demand slackens. Suppliers in some lines face loss of orders and increased pressure to cut prices. Jobbing foundries hard hit

SUBCONTRACTING is tending downward. Many large manufacturers who have been farming out substantial quantities of work now find their own capacity adequate and have pulled in work formerly sublet to outside shops.

Result is that small plants which have depended largely on subcontracts are hit unusually hard by the current softening of business.

Jobbing foundries were among the first to feel the impact of withdrawal of subcontract work. When the slump hit the casting shops last winter, the jobbing foundries were immediately and severely affected, while the larger captive shops, especially those serving the automotive trade, continued on full schedules.

More recently affected have been the stampers, machine shops, parts fabricators and other plants which owe their existence to the specialized services they perform for other manufacturers.

Second Critical Period—This is the second critical period subcontractors have faced since the end of the war. The first came during reconversion from war to peacetime work. As prime contracts were canceled, subcontractors were ordered to stop work and then had to wait until the prime contractors had reconverted facilities to peacetime manufacture for new subcontracts.

An important difference in the two periods lies in the fact that immediately following the war demand for peacetime goods was tremendous and subcontractors were assured of a flood of orders as soon as reconversion was completed. Today, much of the pent-up demand has been satisfied and some subcontractors face an uncertain future.

Decline Is Spotty — The decrease in subcontracting business is extremely spotty. In some fields no decline is noted. In others, the withdrawal of farmed out work is severe.

The automotive industry has not made and does not intend to make substantial changes in its subcontracting setup. This industry has an estimated 50,000 suppliers of parts, equipment, materials and services, and a long peacetime and wartime record of extensive subcontracting.

Automotive buyers, however, are

putting pressure on their suppliers to cut costs. This is nothing new. A constant check always has been kept on suppliers to see that prices are in line. Buyers regularly revise detailed charts on price trends in metals and other basic raw materials, and once a downtrend is evident, such as occurred recently in lead, zinc, scrap iron and steel, the heat is put on vendors using such materials to cut prices.

Subcontractors serving the aircraft, farm equipment, steel mill equipment and a few other heavy industries continue to operate at a high level.

Some Hit Hard—Suppliers to the road building and construction machinery manufacturers, railroad equipment plants, textile machinery, heavy truck and appliance manufacturers have seen their business evaporate. Office equipment makers, electrical equipment manufacturers, producers of oil country goods are cutting back the volume of work sublet.

In some cases these companies admit that the work can be done more efficiently and economically by the specialty shops, but in light of their reduced backlogs they feel warranted in pulling in a portion of outside production to keep their own departments busy.

Long-Term Outlook—Neither prime nor subcontractors profess to foresee any considerable diminution of farming out work for the long pull. Where outside buying has been more economical in the past, it should continue that way in the future. And at today's high equipment and construction costs, primary manufacturers will think twice about venturing into the production of items they previously have bought on the outside.

At the same time, the lower volume of business generally is bringing a real problem to companies depending largely on subcontracts. Competition is forcing profits to be shaved and such work as is farmed out only in rush time is disappearing.

Cleveland Employment Drops

SLOWING tempo of industrial production is reflected in a 3.2 per cent decrease in manufacturing employment in metropolitan Cleveland in March, according to a survey by the Cleveland Chamber of Commerce. Employment has dropped almost 7 per cent since March, 1948.

The chamber's employment index, based on 1939 as 100, now stands at 157.6, compared with a postwar high of 175.3 in March, 1947, and a low of 139.7 in September, 1945, when reconversion was at its height.

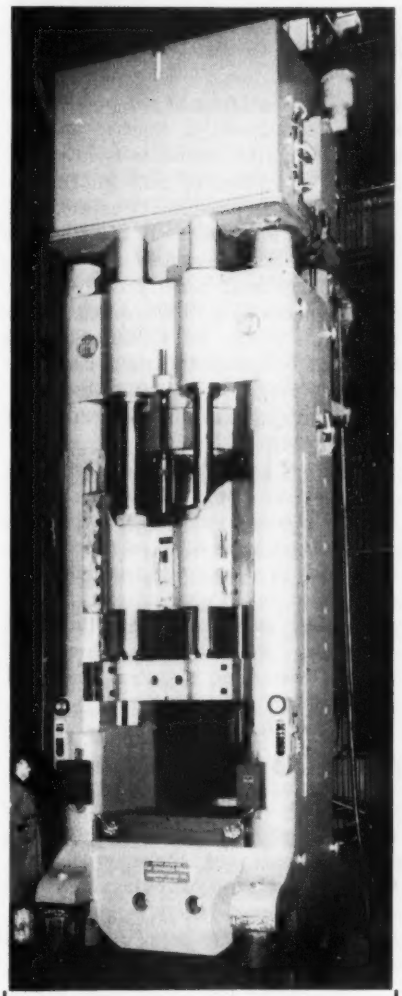
Reappraise Western Steel

Some observers now see growth of industry on Coast slowing down

RAPIDLY shifting pattern of steel supply and demand on the West Coast is bringing about a reappraisal of the immediate and long-range future of the West's newly acquired basic steel industry.

Some observers believe when current expansion plans and projects are completed, the western steel industry will take a rest period in the growth which has more than doubled its capacity in less than a decade.

Although the steel-consuming potential, built up by the growth of fabricating plants, is far above prewar levels, demand is now beginning to level off. If it declines substantially in the next year or two, western steel mills may find they have an excess of producing capacity.



PRESS FOR FRANCE: This 2000-ton double-action hydraulic press, designed and built by the Hydraulic Press Mfg. Co., Mt. Gilead, O., soon will be turning out sheet metal stampings in France. One of the largest ever built for export, press towers 29 feet from floor to top, and a pit 10 feet deep will be required to install base

See Prewar Pattern—Another factor which may reappear is a return of eastern mills to the western market. During the war and postwar periods, most eastern mills withdrew salesmen from the West Coast; demand for their products in home territory was more than sufficient to absorb all of their output. Now that buyers in the East are reducing orders, the eastern mills may return to the West in the search of markets.

This is not to say that any planned expansion in the next year or two is likely to be abandoned. Projects now underway or committed call for a 6 per cent increase in steel producing capacity in California this year, and another 24 per cent increase next year. By the end of 1950, steelmaking capacity is expected to reach 2,766,000 tons, or 650,000 tons above the present level.

What will happen thereafter will depend on the state of demand. It is possible some of the larger companies will then turn to wider diversity of finished products.

Favorable Factor—One favorable factor for the West's two largest mills —Geneva and Fontana—is the indication that demand for heavy plates will continue large for a number of years to come. Utilities, oil companies and pipeline firms are still actively bidding for plates for large diameter pipe and the plans now being considered for new pipelines indicate there will be little or no diminution in this demand for the next four years.

Meanwhile, immediate problems occupy most of the attention of western steel men. The shift from a sellers' to a buyers' market for most products is continuing.

Operations High—Although operations of steel ingot producers and the larger rolling mills are continuing at a high level, production in shops of small fabricators and in iron foundries has slumped sharply and has failed to rebound.

An official of the metal trades union council in San Francisco reports two-thirds of the unions' membership are idle and the remaining members are working only three or four days a week.

Unemployment throughout the West Coast states has been increasing at a faster rate than in the rest of the country, and estimates indicate more than 700,000 people are out of work.

Steel Sales Efforts Extended

Partial reversal of selling policy of past couple years seen in broadening of market horizons. Some producers now seeking business distant from mills

STEEL salesmen again are beating the bushes for business. They are calling on consumers they haven't seen for a long time past, and, significantly, they are offering tonnage for delivery at points of consumption distant from producing plants.

How times have changed! Only a few months ago the steel producers were turning down business from the hinterlands. Today they are seeking it. On its face, the seeking out of business at distant points appears at least partial reversal of steel sales policy over the past several years, especially since abandonment last July of the basing point system in favor of f.o.b. pricing. Under that policy producers confined shipments as far as possible to areas adjacent producing plants.

Hats in Hand—With supply-demand balance rapidly approaching—it's already here in alloys and specialties—producers again are wooing distant buyers. Just how they will be received by customers they had practically abandoned during the period of lush demand is a matter for considerable speculation. However, today it looks as though predictions the steel producers would be back with "hats in hand" looking for buyers' favors when things returned to normal are coming true. Sales efforts are being stepped up in the "forgotten" areas, and closed branch sales offices reopened. One large producing interest has reopened Buffalo offices.

In a few instances tonnage is being offered with freight charges equalized to permit delivered price competition. For the most part, however, full freight from point of production is charged though the view is widely held in the trade that freight absorption on an increasing scale will develop on the part of the mills as the fight for business intensifies. This view is reinforced by the expectation in some circles that Congress may enact legislation effecting a two-year moratorium on anti-trust law prosecution in the matter of freight absorption, to permit thorough study of the problem based upon whatever ruling is made by the U. S. Supreme Court in the Rigid Steel Conduit case now before it. The Justice Department says it has no serious objection to such a moratorium.

Conditions in the various steel consuming areas differs considerably but the trend toward resumption of shipments from outside points is in evidence at virtually every point. The situation as reported by STEEL's district editors follows:

Distribution Under Review

PITTSBURGH — Steel distribution pattern is under constant review by most producers with balance between supply and demand for growing number of steel products indicated by close of second quarter. To date signs of a return to a buyers' market have been limited to nearly complete abandonment of conversion steel transactions, price reductions to competitive levels, curtailment in electric furnace and open-hearth output in isolated instances, offerings of mill allotments in excess of previously established quotas and more recently offerings to consumers not previously served.

One large mill here recently made commitments to ship hot-rolled sheets via barge to the St. Louis area and has made merchant carbon bar tonnage offerings to prospective customers on a spot basis in those districts normally served.

With few exceptions steel products continue to be priced at mill, although some smaller interests in the Midwest have adopted a competitive price in a major consuming area that in at least one instance is reported to be lower than the mill quotation. Some small producers of tubing, fasteners, stainless and tool steels never did adopt mill pricing.

More Steel Now Available

CHICAGO—If it wants to pay the freight, midwestern metalworking industry can get more mill steel. Salesmen of some prominent eastern mills have made their reappearance, but are apparently doing more scouting than selling.

Until confusion over the basing point question is ended it seems unlikely the steel mills which closed their sales offices in the hinterlands will reopen them. But this is not to say present sales efforts will not pay of.

Direction of the withdrawals at the time of basing point abandonment having been predominantly eastward, there is now no noticeable tendency for midwestern steelmakers to try to invade eastern markets. In the Midwest, too, are a number of producers who continue to sell in the Chicago market and in the South by equalizing freight and meeting competitors' prices. Some independent wire makers, in particular, have followed this practice.

Seeking Business on Coast

LOS ANGELES—Steel consumers in this district report that out-of-state mills are actively back in the market. The trend became pronounced with early second quarter allocations. One seller is pushing sales of its wire products on the Pacific Coast, and is equalizing the lowest rail price. Another producer, located in the Pittsburgh district, is supplying customers here with electrical sheets, although it is not equalizing. Still another eastern producer is shipping special-quality sheet from its eastern mills.

Little Change Is Reported

DETROIT—Quick check shows few, if any, outside mills which have hitherto discontinued automotive accounts because of freight disadvantage, offering tonnages to auto company buyers. There are occasional "conversion wolves" attempting to peddle material, but this business largely has been terminated because of the excessive cost. As steel production progressively eases, sellers who have withdrawn from Detroit are expected back.

Horizons Reported Broadening

NEW YORK—While steel producers are still centering interest on development of business as near their mills as possible, most, nevertheless, are looking beyond recent horizons. In other words, producers that had practically withdrawn from certain districts, as a result of the shift from a multiple basing point to a mill pricing policy, are now, as general demand continues to shrink, showing a livelier interest in renewing old contacts.

Competition Coming from Outside

BUFFALO—District steel producers are encountering increased competition from mills in other areas. One of the chief producers, which does not have a plant in this territory, has reopened sales offices for its operating subsidiary units. The company closed its sales offices here in 1948 when the pricing system was revised, but is back in business again.

On the other hand, heavy shipments are being made by local mills to buyers elsewhere.

Allocations Approved

ECA nations, reclamation projects to get earmarked steel from May through September

VOLUNTARY allocation plan for providing 159,264 tons of steel products to ECA countries during the period May through September has been approved by Commerce Secretary Sawyer. At the same time it was announced that the plan for allocating 83,618 tons of steel for federal reclamation projects in the same period also had been given approval.

Under the ECA allocation total tonnages will be shipped as follows:

	(Net tons)
Norway	62,799
Denmark	20,225
Sweden	15,340
France	12,000
Netherlands	10,350
Switzerland	8,825
Italy	5,000
Trieste	4,475
Greece	3,850
Portugal	2,875
Bizonal Germany	2,500
United Kingdom	2,500
Austria	2,425
Turkey	1,800
Korea	1,600
Belgium-Luxemburg	1,500
Iceland	1,050
Ireland	150
Total	159,264

Federal reclamation projects covered by steel allocations are:

All-American, California
Belle Fourche, South Dakota
Boise-Anderson Ranch, Idaho
Boise-Payette, Idaho
Boulder Canyon, Arizona-Nevada
Central Valley, California
Colorado-Big Thompson, Colorado
Columbia Basin, Washington
Davis Dam, Arizona-Nevada
Deschutes-Ochoco Dam, Oregon
Fort Peck, Montana
Gila, Arizona
Hungry Horse, Montana
Kendrick, Wyoming
Klamath, Oregon-California
Lewiston Orchards, Idaho
Missouri River Basin (various states)
Ogden River, Utah
Palisades, Idaho
Paonia, Colorado
Provo River, Utah
Rio Grande, New Mexico-Texas
Riverton, Wyoming
San Luis Valley, Colorado
Santa Barbara County, California
Yakima-Roza, Washington

Secretary of Commerce Sawyer last week also announced that effective Apr. 15 the Office of Defense Transportation will be relieved of the responsibility of administering the voluntary plan providing steel products for freight cars and barge programs. This work will be taken over by the Office of Industry Cooperation.

OIC Calls Allocations Meeting

IN RESPONSE to a recent suggestion by the Steel Products Advisory Committee that monthly conferences be held with the Office of Industry Cooperation to review various steel allocation programs and thus prevent any misunderstandings, OIC has invited the committee to meet Apr. 12.

At that time no new allocations requests will be made to the steel industry. However, there is likelihood steel requirements to be generated in carrying out the rearming of Europe under the North Atlantic Security pact will be discussed in a preliminary way.

Subject Studied—So far the interdepartmental group which has been studying this subject under the sponsorship of the State Department has been unable to freeze definite tonnage figures, and this likely will not be possible until certain strategic decisions have been made by the joint chiefs of staff.

Whether a proposal to cut manganese consumption through a voluntary agreement will be discussed at this meeting has not been decided; no definite course of procedure in this connection has been decided as yet by government officials.

Latest word in the controversy between Commerce and Interior as to whether enough steel is going into line pipe and oil country goods comes from Commerce's Office of Domestic Commerce.

The report, without mentioning Interior's contention that more steel is required for these applications, rejects that argument. In brief, the report finds that as a result of increased construction of pipe lines, barges and ocean tankers, petroleum transport facilities in the United States now in existence or under construction are adequate.

SAFETY DEVICE: Girl worker tries out a new safety device, made by Hoffman Engineering Corp., Anoka, Minn., at the 19th annual safety convention and exposition in New York. When worker's hands are in danger area—beam of light—machine will not operate. Note light source at left and photo-cell assembly to right of girl's hands. NEA photo

Plan More Construction

Commerce Department estimates 1949 total will exceed that of 1948 by about $1 billion

AT A RECENT staff meeting, Commerce Department's Construction Division decided it was not unduly optimistic when, last November, it estimated new construction in 1949 would come to about $1 billion more than in 1948. In fact, it has decided to increase by $50 million its estimate of school and hospital construction in 1949.

Final estimate of the division, reached jointly with the Department of Labor, is that total construction in 1949 would be in the neighborhood of $18,800 million compared with $17,775 million in 1948. Private construction is expected to be about the same as last year, namely, $13,750 million compared with $13,735 million in 1948. The big increase is in public construction, which is expected to be about $5050 million in 1949 compared with $4040 million in 1948.

Current estimates, by classifications, are:

ESTIMATED NEW CONSTRUCTION ACTIVITY in 1948 AND 1949[1]
(Millions of dollars)

Type of construction	1948[2]	1949
Total new construction	17,775	18,800
Total private	13,735	13,750
Residential (excl. farm)	7,100	6,500
Nonresidential building	3,600	4,050
Industrial	1,380	1,300
Warehouses, office & loft bldgs	350	450
Stores, restaurants & garages	910	1,000
Other nonresidential building	960	1,300
Religious	230	325
Educational	245	325
Hospital and institutional	115	175
Social and recreational	215	275
Hotels and miscellaneous	155	200
Farm construction	500	450
Public utility	2,535	2,750
Railroad	350	350
Telephone and telegraph	675	725
Other public utility	1,510	1,675
Total public	4,040	5,050
Residential	65	150
Nonresidential building	970	1,375
Educational	525	725
Hospital and institutional	200	400
Other nonresidential building	245	300
Military and naval	150	175
Highway	1,550	1,700
Sewer and water	450	550
Misc. public service enterprises	105	125
Conservation and development	600	750
All other public	150	175

[1] Joint estimates of the Department of Commerce and the Department of Labor.
[2] First 10 months actual; last 2 estimated.

Discuss Unified Screw Threads

Effects of American-British action on industry studied in technical sessions of National Screw Machine Products Association's annual meeting. C. D. Hoyt elected president

CHARLES D. Hoyt Jr., Charles D. Hoyt Co., Mishawaka, Ind., was elected president of the National Screw Machine Products Association at its 16th annual meeting, Boston, April 3-6. He succeeds Robert Chestnut, Aluminum Co. of America, Edgewater, N. J.

Unified thread standards and their future effect on industry were discussed at technical sessions, Carl W. Bettcher, Eastern Machine Screw Corp., New Haven, Conn., covering internal threads; William C. Stewart, technical adviser, American Institute of Bolt, Nut & Rivet Manufacturers, external threads, and Harry F. Fischer, Fischer Special Mfg. Co., general review.

Adoption of this unified screw thread system is of special importance as to effect on current stocks of chasers, taps and gages. In the case of many die head chasers the same tools can be used for unified systems as for the American-National by adjusting the die head to provide pitch diameters on screws with tolerances specified.

Proposed Publication — Proposed American Standards publication covering unified and American screw threads for screws, bolts, nuts and other threaded parts was studied during the meeting. American Standards publication will include thread sizes and tolerance systems on which Canada and England are in agreement, also American standards not included in the new British standards.

Digest of some revisions and their effects includes:

Thread angle—thread form will have a 60-degree included angle, same as the American-National form, British changing from 55 to 60-degree.

Root of screw—rounded root contour with high limit similar to the round previously permitted by a worn tool and a low limit with a flat equal to American basic flat P/8 are now described as permissible with a new tool.

Crest of screw—American manufacturers will continue present flats, but permit a round; British will round theirs.

Crest of internal thread—both will have flats created by the tap drill.

Root of internal thread—American will be flat or slightly rounded but with flat limits between P/8 and P/24: British will have rounded tapped hole roots, but with major diameter greater than basic.

Thread series—will include present American coarse and fine series, but only sizes from ¼-inch up are unified. Coarse thread series are similar to present American National as to sizes, but a ½-inch-12 is added, this being an extremely popular British size; in the fine pitch series, the 1-inch diameter thread will be 12 threads per inch instead of 14.

Thread classes—new tolerances are developed for screws and for tapped holes. These tolerances are based on a formula varying tolerance with: 1. Basic major diameter, 2. length of engagement and 3. pitch.

Tolerance tables are also provided from selected groups of special sizes in which tolerances are based on length of engagement of nine threads. Old class 2 and 3 fits will probably be continued for some time because of investment in gages.

Purpose of allowance in the new class 2A and 2B system of tolerances provides limits ensuring that maximum screw is never as great in pitch diameter as the minimum tapped hole. This allowance is important to mass production assembly. With the old fit systems, screws frequently are too tight a fit for a tapped hole.

Quality control was stressed by Dorian Shainin, chief inspector, Hamilton Standard Propeller Division, United Aircraft Corp., East Hartford, Conn. "Atomic Energy—From Dwarfs to Super Giants," was the topic of Dr. George Z. Dimitroff, professor of Astronomy, Dartmouth College, Hanover, N. H.

Panel Sessions Featured — Panel sessions marked the convention, one covering members' problems with case history solutions given. Panel members were Melvin K. Kuntz, E. W. Schneider, George W. Sprague, E. M. Ross, Daniel F. Viles and Eric Nord.

James J. Healy, executive director, Trade Union Fellowship, Harvard University, spoke on "1949 Industrial Relations Policies for Small Companies" on the closing day.

Selling screw machine products was a panel session subject, four purchasing agents being panel members. They were L. D. Muldoon, Jenkins Bros., Bridgeport, Conn.; Ronald Jones, A. C. Gilbert Corp., New Haven, Conn., R. G. Koch and J. K. Dolan, High Standard Mfg. Co., New Haven. Representing screw machine product industry members were Roy V. Woodworth, N. A. Hewitt, T. V. Sullivan and John R. Cox.

Officers Elected — Other officers elected by the association are: Cecil E. Lucas, Lucas Screw Products Inc., Rochester, N. Y., vice president; William N. Grass, M. J. Grass Screw

STEEL DISTRIBUTION FOR FEBRUARY AND YEAR TO DATE

Steel Products	Number of Consumers	Item	February - 1949			To Date This Year		
			Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Per cent of Total Shipments	Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)
Ingots, blooms, slabs, billets, tube rounds, sheet and tin bars, etc.	47	1	308,149	5.6	259,774	* 618,827	5.5	* 552,729
Skelp	6	2	6,523	0.1	42,929	11,456	0.1	88,565
Wire rods	19	3	54,129	1.0	23,665	108,372	1.0	46,907
Structural shapes (heavy)	11	4	358,616	6.5	2,851	* 716,945	6.3	4,917
Steel piling	3	5	21,274	0.4	924	47,456	0.4	924
Plates	28	6	589,572	10.7	21,769	1,197,863	10.6	51,084
Rails—Standard (over 60 lbs.)	4	7	161,614	2.9	2,048	328,834	2.9	2,409
Rails—All other	5	8	17,024	0.3	48	30,687	0.3	142
Joint bars	7	9	12,205	0.2	2,968	24,446	0.2	5,287
Tie plates	6	10	38,522	0.7	-	77,714	0.7	41
Track spikes	8	11	10,598	0.2	35	23,673	0.2	35
Wheels (rolled or forged)	5	12	27,494	0.5	113	57,299	0.5	199
Axles	5	13	19,301	0.4	3	38,863	0.3	7
Hot rolled bars (including light shapes)	39	14	654,936	11.9	62,921	*1,351,862	12.0	* 137,744
Hot rolled bars—Reinforcing	23	15	133,239	2.4	249	272,099	2.4	1,138
Cold finished bars	33	16	138,217	2.5	1,094	* 280,626	2.5	* 2,325
Tool steel bars	17	17	5,905	0.1	87	12,528	0.1	205
Pipe—Standard	16	18	184,730	3.3	3,946	373,611	3.3	9,420
Pipe—Line	12	19	178,582	3.2	1,904	368,264	3.3	4,569
Pipe—Oil country goods	14	20	115,862	2.1	7,572	239,614	2.1	16,409
Tubes—Boiler	3	21	9,566	0.2	825	19,663	0.2	2,397
Tubes—Mechanical and pressure	20	22	71,283	1.3	2,151	145,371	1.3	4,761
Miscellaneous pipe (including conduit)	11	23	23,811	0.4	198	48,773	0.4	718
Wire—Drawn	37	24	216,342	3.9	13,624	452,223	4.0	28,940
Wire—Nails and staples	17	25	72,496	1.3	1,125	147,555	1.3	2,310
Wire—Barbed and twisted	14	26	22,324	0.4	11	44,475	0.4	15
Wire—Woven wire fence	12	27	34,834	0.6	273	69,345	0.6	669
Wire—Bale ties	11	28	4,328	0.1	-	10,436	0.1	-
Black plate	10	29	66,702	1.2	-	134,838	1.2	-
Tin and terne plate—Hot dipped	9	30	142,204	2.6	-	282,564	2.5	10
Tin plate—Electrolytic	10	31	157,766	2.9	-	316,426	2.8	42
Sheets—Hot rolled	28	32	606,643	11.0	51,148	1,239,390	11.0	121,748
Sheets—Cold rolled	15	33	552,958	10.0	1,123	1,156,851	10.2	2,915
Sheets—Galvanized	15	34	130,686	2.4	12	271,686	2.4	169
Sheets—Long terne	8	35	13,653	0.2	136	25,962	0.2	227
Sheets—Enameling	7	36	19,530	0.4	207	42,877	0.4	297
Sheets—Electrical	11	37	41,084	0.7	-	89,799	0.8	-
Strip—Hot rolled	22	38	146,220	2.7	22,296	300,768	2.7	53,580
Strip—Cold rolled	34	39	150,069	2.7	1,923	* 315,962	2.8	3,896
All other	2	40	947	-	-	* 2,567	-	-
Total steel products	138	41	5,519,938	100.0	329,912	*11298,570	100.0	*1,147,750

* Adjusted.

Machine Products Co., Buffalo, treasurer; Orrin B. Wentz, executive secretary; and Margaret S. Ballinger, secretary.

Equipment Markets Seen Abroad

THERE is a trend to mechanization in both Latin America and Europe, American official observers note in recent reports to the government, which may spell new outlets for American machinery in time.

The trend is noticeable in both farming and other activities. However, the ECA points out that "Europe's farms are far behind U. S. farms in mechanization and labor saving devices."

And on the industrial side, said this agency, where each industrial worker in the United States is backed up by six to seven horsepower in electric power, the worker in Great Britain has behind him only three horsepower of electric energy, and on the continent of Europe, only two.

McCarthy Begins Oxygen Output

McCARTHY Chemical Co. has begun producing more than 175 tons per day of 90 to 95 per cent pure oxygen from a new plant at Winshire, Tex., for low-cost extraction from the air. The unit, an integral part of McCarthy's petro-chemical facilities, was built by Stacey-Dresser Engineering Division of Dresser Industries Inc., Cleveland.

Graphite Bronze Plant Toured

CLEVELAND Graphite Bronze Co., Cleveland, in observance of its thirtieth anniversary, last week held an inspection party for about 200 key manufacturing executives and professional people. James L. Myers, president, told the visitors their tour was to be the same that is given to many hundreds of groups of all types that are continually being shown the new facilities of the company.

Steel Shipments Hold Steady

SHIPMENTS of steel products held fairly steady during February on a daily basis, but the total showed a slight decline due to the shorter month compared with January, according to the American Iron & Steel Institute. Compared with the like month a year ago, shipments gained 9.4 per cent.

Net shipments amounted to 5,519,938 tons in February compared with a revised total of 5,778,632 tons in January and 5,046,115 tons in February, 1948. Shipments to members of the industry for conversion into further finished products and for resale totaled 529,912 tons in February and 617,838 tons in January.

The method of reporting has been changed by the institute, so that shipments of products under the various classifications are not all exactly comparable with those of a year ago but the pattern has held practically unchanged. Hot-rolled bars, including light shapes, totaled 654,936 tons in February of this year, or 11.9 per cent of the total; hot-rolled sheets, 606,643 tons, or 11 per cent; cold-rolled sheets, 552,958 tons, or 10 per cent; plates, 589,572 tons, or 10.7 per cent; heavy structural shapes, 358,616 tons, or 6.5 per cent; ingots, blooms, slabs, billets, tube rounds, sheet and tin bars, etc., 308,149 tons, or 5.6 per cent; and drawn wire, 216,342 tons, or 3.9 per cent.

Installing Cold Strip Mill

WALLINGFORD Steel Co., Wallingford, Conn., expects to have in operation early in August a new two-stand four-high 24-in. cold-rolled strip mill, constructed by United Engineering & Foundry Co., Pittsburgh. The new mill is expected to have rated capacity of 500 tons of stainless steel strip monthly. Company also is installing new annealing and slitting facilities.

Inland Expansion Progresses

INLAND Steel Co. spent more than $32 million in 1948 for expansion and improvement and acquisition of new raw material properties. The company has already spent $70 million on expansion since the war and will allot about $55 million more by the time the program is completed in 1951.

These expenditures will increase Inland's annual ingot capacity from 3.4 million tons to about 4 million tons and will make possible a 50 per cent increase in production of tin plate and other tin mill products, as well as a 40 per cent increase in capacity for processing and finishing cold-rolled sheets.

Improvements under way include the redesigning of open hearth furnaces at Indiana Harbor, Ind.; improved facilities for handling greater quantities of raw materials and molten steel; facilities for using oxygen in the steelmaking processes; and an additional hot metal mixing station. Expansion of manufacturing facilities last year included installation of new equipment in the coke plant, start of construction on a battery of 65 new coke ovens at Indiana Harbor which will be completed late this year and continuation of a program launched in 1947 to modernize equipment and expand facilities at the hot and cold-rolled strip mills. The program will be completed in 1949 and will enable Inland to increase its output of these products by about 300,000 tons per year.

Additional sources of iron ore wlil be procured from a reopened mine near Crystal Falls, Mich.; stripping operations near Crosby, Minn.; participation with other steel companies in formation of Consumers Ore Co. which purchased an interest in Butler Brothers, operator of Minnesota ore mines; and acquisition of additional lands in the Marquette and Menominee ranges in Michigan.

Technical Sessions

Feature annual meeting of Metal Powder Association. B. T. DuPont elected president

B. T. DUPONT, sales manager, Plastic Metals Division, National Radiator Co., Johnstown, Pa., was elected president, Metal Powder Association, at the organization's fifth annual meeting at the Drake Hotel, Chicago, April 5-6. He succeeds H. E. Hall, president, Metals Disintegrating Co., Elizabeth, N. J.

T. L. Robinson, president, Wel-Met Co., Kent, O., formerly chairman of the board, was named vice president to succeed S. K. Wellman, president, S. K. Wellman Co., Cleveland, and V. T. Price, vice president, Pyron Corp., Niagara Falls, N. Y., was made chairman of the board.

Technical Sessions—Speakers at three technical sessions discussing production of metal powders and use of these powders in manufacture of structural parts provided evidence of powder metallurgy progress in the postwar years.

In the past decade the industry has made tremendous progress. During this period consumption of iron powder has expanded from 100 to 600 tons a month, copper powder from 200 to 700 tons a month and lead powder from 25 to 70 tons per month. Brass powder has risen steadily, nickel to a lesser extent.

Swedish producers who once had a virtual monopoly in the field now supply only about half of United States powdered metal requirements. It is stated that although Swedish interests pay a tariff of $1.25 a gross ton, they still are able to undersell the domestic products by 5½ cents a pound. The association has sought tariff revision.

Windows of Washington

Administration advisers believe business vitality will continue high, that unemployment will not become serious and that government can dike weaknesses in economy

DO TOP government officials see a serious business recession ahead? Are they talking optimistically for psychological effect? Do they really mean what they say?

These are the questions being asked not only in Washington these days, but all over the country.

Best answer appears to be: The administration spokesmen are sold on the concept that even though the peak has been passed, business vitality continues high. And they are confident that any chinks in the economy due to falling off of private business can be filled in by government.

President Truman at his recent press conference went so far as to characterize the recent easier trend as "a healthy thing pointing to continued prosperity on more stable levels." The recent price declines, he said, are only a temporary letup in the inflationary pressures and he emphasized that he still wants Congress to pass his anti-inflation program, including price fixing and rationing powers, and to enact the tax increase he called for in January. In other words, the President made it clear that in his opinion a resumption of inflation is just around the corner.

Favorable Atmosphere Lacking—Actually, the White House, at least for the moment, has dropped its insistence upon enactment of the anti-inflation program plus higher taxes. There just isn't a favorable atmosphere on Capitol Hill for these proposals at the moment. Later, however, when Congress gets some of the requests now brewing at the White House the situation may change.

The new programs which are being shaped up are aimed primarily at promoting national security, with an eye out for their value in creating jobs should private employment continue to fall off as in recent weeks. They will reach big dollar figures. One of them is the program, on top of the Economic Cooperation Administration program, for rearming Europe under the new Atlantic Pact; current estimates range from $1 billion to $2 billion with the likelihood this will be but the beginning. Another program under consideration is to have the government order 550,000 freight cars at a cost of $2.5 billion and lease them to the railroads. Another calls for an indefinite number of air transport planes which the government would buy and lease to the airlines. Argument for these two latter proposals is that the railroads and airlines cannot afford to procure such equipment in the quantities necessitated by the national security.

Hold Out for Steel Expansion—Lately administration thinking about putting the government into the steel business has veered around to the place where a new, single request, divorced from the omnibus Economic Stability bill, may be sent to Congress. This, instead of asking the President for blanket powers, would call for authority to erect certain steelmaking facilities at government expense, possibly to be held in standby for an emergency, and to be operated by private parties in such an emergency. The talk is a government-financed expansion program with capacity for 10,000,000 tons of ingots annually. The total investment might come to $3 billion.

In addition, there has been increasing discussion of late about drawing up a program to be submitted to Congress in the event that the present easier trend should develop into a tailspin. Nobody in the government seems to fear such an eventuality so that it is a matter of getting ready—just in case. The program falls under two heads: The amount of government-financed work the government could let out to bolster sick private business, and the various economic supports and controls the government would want to use under such conditions.

No Economy Talk—One thing is sure; there isn't any economy talk in any influential quarters at either end of Pennsylvania avenue at the present time. Administration officials recall that business took a big slump when Roosevelt cut federal expenditures in 1937, and they are averse to inviting a repetition.

And unemployment has not gotten to a level that worries the administration or Congress. Latest estimates of the Department of Labor indicate that unemployment at the end of the year should be 3,800,000 as compared with 3,200,000 right now.

So the prevailing sentiment at Washington is one of optimism, based first on the fact that private business continues good and second on the belief that when private business falls off the government can step in with projects that will fill the gap. And the money will have to be raised through increased taxes—if not this year, then next.

Incidentally, the size of the national debt doesn't seem to cause any shudders in Washington anymore. One administration official remarked to STEEL: "The debt now is only $251,724,000,000 and this includes the deficit financing in World War II. . . ."

Opposes Uniform Jobless Tax

GENERAL Motors Corp. is opposing the plan of the Social Security Administration and the Senate Finance Committee's advisory council on social security to establish a uniform federal tax on employers under a federal unemployment insurance program that would omit experience rating, namely, the feature under which an employer's tax is reduced if he has a record of providing steady employment. George Jacoby, General Motors' personnel services director, speaking at a symposium conducted by the Chamber of Commerce of the United States, said the incentive to save money on the unemployment tax keeps employers interested in seeing that the program is administered properly and in holding unemployment to minimum.

Labor's attitude in pressing for a federal, instead of the present state system, is that state laws conflict, that too few workers are covered, and that benefits are too low and too slow in being issued.

Berkner Heads Aid Program

APPOINTMENT of Lloyd V. Berkner to direct the "Military Assistance Program" of the State Department marks a definite step toward evolving a plan for rearming Europe under the new Atlantic Security Pact. In announcing the appointment, Secretary Dean Acheson said that no program has been set up as yet, even for submission to the Bureau of the Budget, but "we hope to have the draft legislation available

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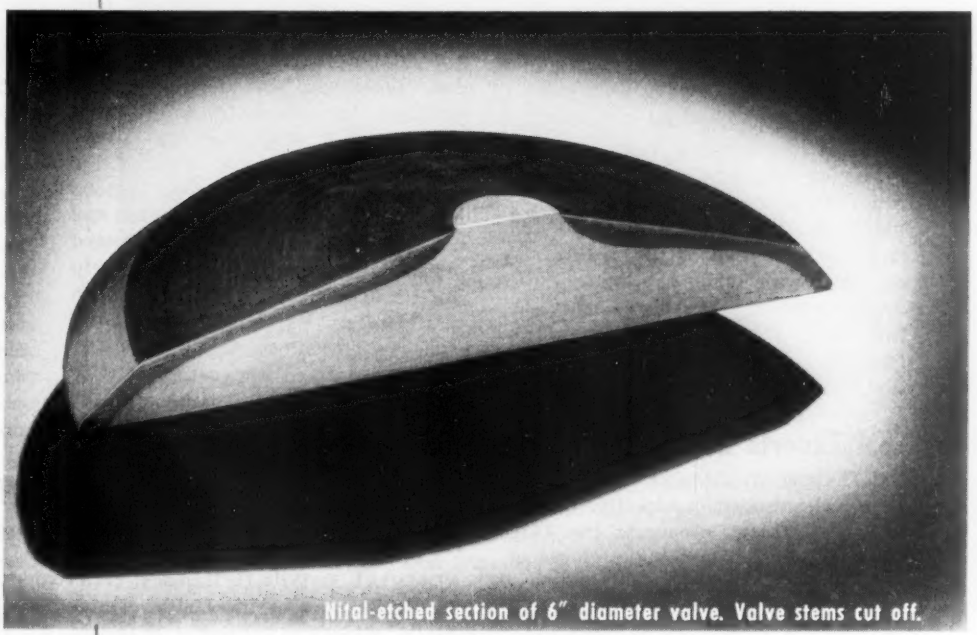
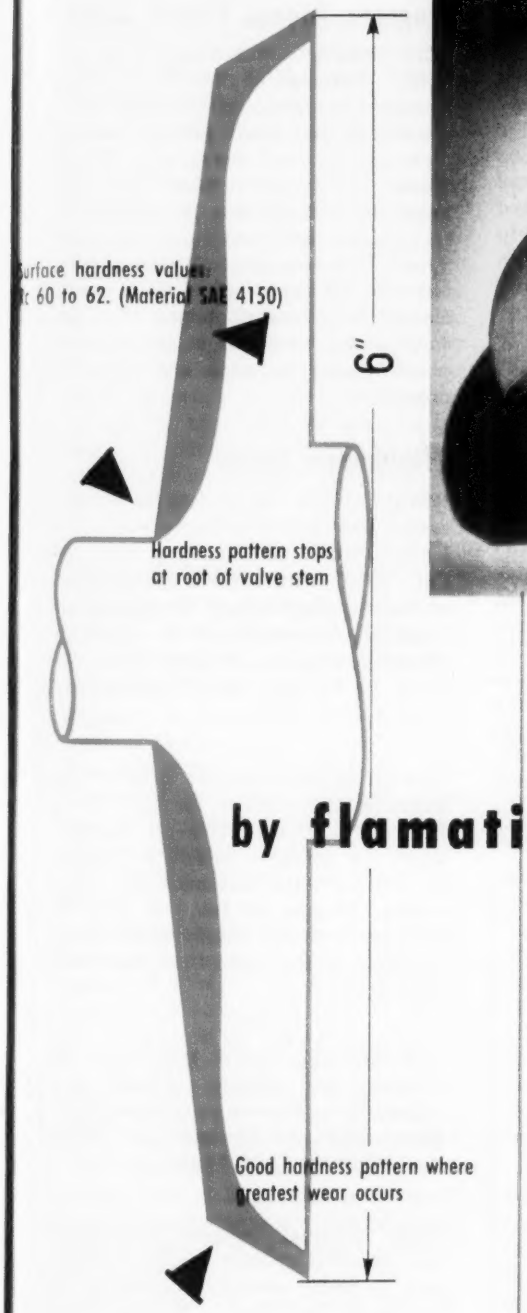


Nital-etched section of 6" diameter valve. Valve stems cut off.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for study by the time the Senate is considering the Atlantic Pact."

"The draft legislation," he said, "will probably contain a specific authorization for an over-all amount needed for a program one year in duration. It seems likely that authority will be sought for a program extending over a longer period of time, but the authorization of funds would be for only one year."

Evidently having in mind Gen. Charles de Gaulle's demand that France be given priority in shipping American arms to Europe, Mr. Acheson said: "The legislation as it is now contemplated would not name countries specifically eligible for military assistance. In a program of this type, it is essential that the President have considerable discretion in its administration."

Coal Exports Lower

HUGE postwar flow of coal to Europe has subsided drastically; on the basis of present prospects the 1949 exports will be far under those of recent years. Bituminous coal exports in 1947 were 68,666,963 net tons and in 1948 were 45,918,230 net tons. Our total exports in January of 1949 were 2,083,486 net tons of bituminous.

Heaviest exports continue to go to Europe, which took 1,128,616 net tons of bituminous in January. Europe continues to take fair amounts of coking coal, notably Italy for its iron industry. Shipments of coking coal to Japan came to 156,489 net tons in January.

Science Staff Needs Help

POSSIBLY some encouragement from industry might help the State Department in its effort to find funds to rejuvenate the dwindling science staff attached to our London embassy. Other government agencies interested in information that may be collected at this observation post are being solicited for contributions. Whether contributions from industry should be accepted has not been determined—but interested organizations might be able to help the cause along by getting in touch with State's Foreign Service Division, Washington 25, D. C.

State wants to revive this activity as part of a move to carry out the Truman Point Four program to encourage world production by an exchange of "know-how."

AIA Names Admiral Ramsey

ADMIRAL DeWitt C. Ramsey, retiring commander of the United States Pacific Fleet, will become president of the Aircraft Industries Association of America Inc., Washington, on July 1, succeeding Oliver P. Echols who recently became board chairman of Northrop Aircraft Inc. Captain Leland D. Webb, now acting general manager of the association, will resume his post as manager of the association's West Coast office on July 1. Admiral Ramsey, now 61, is a pioneer Navy airman and commanded the carrier Saratoga during the Solomon Islands campaign. The last two years of the war he served as chief of the Navy's Bureau of Aeronautics.

Proposes Atomic Power Study

SEN. BRIEN McMAHON (Dem., Conn.) chairman of the Joint Atomic Energy Committee of Congress, has announced that study will be started early in the next fiscal year of an atomic energy power plant program involving expenditures of "hundreds of millions" over a five or six-year period. The senator, following a conference with engineers of the Atomic Energy Commission, hoped that an early result would be atomic mobile power plants for ship and airplane propulsion.

Washington Notes

RECIPROCAL air transport agreements now are in force between the United States and a large part of the "free" world. State Department announces signature of the 37th such bilateral agreement—with Finland, whereby our air carriers may operate to Helsinki and Finnish carriers to New York.

—o—

STATE Department has directed the Supreme Commander for the Allied Powers in Japan (General MacArthur) to arrange patent protection for United States nationals who were unable, because of the war and its aftermath, to file patent applications in Japan at the same time they filed elsewhere.

—o—

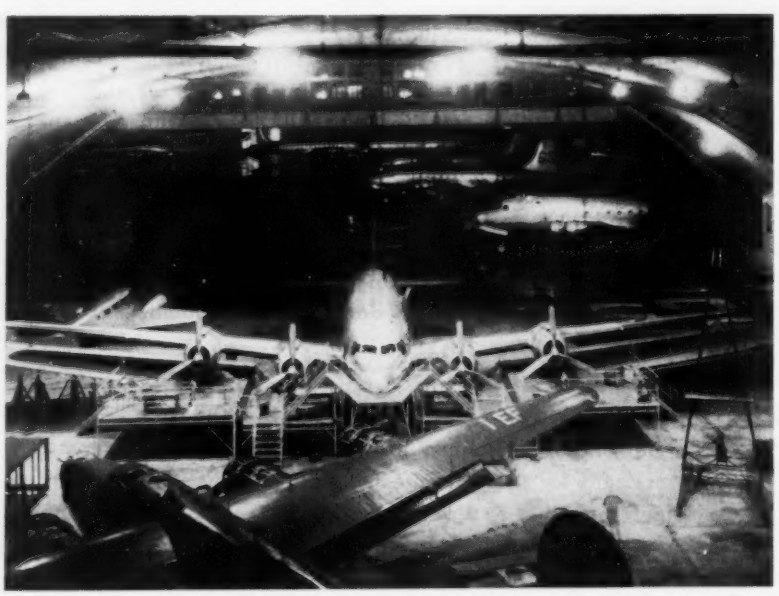
AIR FORCE shortly will move its Airplane and Engine Mechanic School from Keesler Air Force Base, Biloxi, Miss., to Sheppard Air Force Base, Wichita Falls, Texas.

—o—

THE National Science Foundation bill, recently passed by the Senate, now is being actively considered by the House Interstate & Foreign Commerce Committee.

—o—

ISSUANCE by the Office of Naval Research of the brochure containing the proceedings at the recent titanium symposium in Washington has been delayed. In the meantime copies of the papers may be bought in photostat or microfilm form; details may be had by addressing the Office of Technical Services, Commerce Department, Washington 25, D. C.



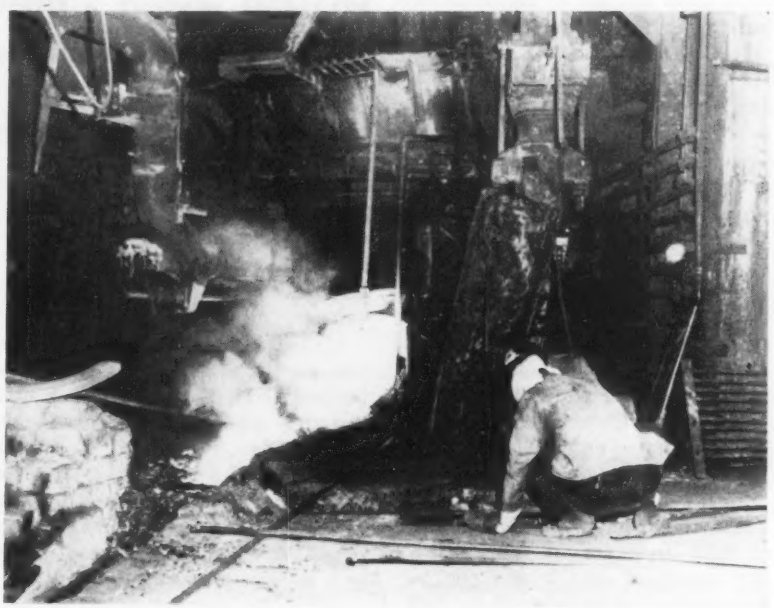
TIME SAVER: This maintenance stand has enabled the Navy to cut in half the time required to complete a routine mechanical check of 4-engine transport planes. The 127-foot check stand features built-in oil filling and draining facilities, engine washing and drying system, its own light system and its own tool cribs

Britain Lifts Subsidies

Action may affect stalemated steel nationalization bill. Socialization seen gaining in Ruhr

ISSUE of nationalization, which threatens many privately owned Western European industries, may be gaining even more vigorous support in Great Britain and Western Germany.

In Britain, lifting of government steel subsidies may help Labor proponents of the steel nationalization bill to undermine some of the opposition to it. Rank-and-file elements of the Labor party have also drawn up demands for a public ownership program far more ambitious than the projects now under consideration by the party's executive group. In the Ruhr a group of 12 Germans approved by the Allies as trustees for the steel industry has been assailed as being predominantly in favor of socialization.



JAPANESE IRON: Production of iron has been raised from 15,000 to 20,000 tons monthly at this blast furnace of the Nippon Steel Tube Co., Kawasaki, Japan, through use of imported coking coal, made possible by American financing. Also imported by the company are iron ore, magnesia clinker, manganese ore, and fuel oil. NEA photo

Great Britain

BRITAIN'S Labor government, in halting the $100 million subsidies on imported ores, scrap and semifinished steel, may spike one of the major arguments used by opposition forces against the steel nationalization bill, now stalemated in Parliament. The Conservatives have charged that public ownership of steel would mean unfair subsidization and discrimination against privately owned industries.

The subsidy withdrawal brings an average increase in iron and steel prices of 9 per cent, a boost which comes at a time when the opponents to nationalization have been pointing to the low steel prices prevailing under private ownership. The 9 per cent jump, incidentally, is not expected to make up for the subsidies. Steel consumers expect to be hit by this government action, and automobile manufacturers have already predicted that a price rise in many models is inevitable.

Publication of resolutions to be presented by local party groups at the annual Labor party conference at Blackpool June 6-10 indicate that the executive body's "go-slow" policy on nationalization after 1950 will meet with vigorous opposition.

The June conference will evolve the party's platform for the next general election in 1950 when one of the main issues will be that of steel nationalization. Having aroused such bitter controversy on this matter, British labor leaders were expected to go slowly on public ownership programs for other industries. The executive's nationalization program for the period immediately after 1950, it is understood, would affect only water, meat wholesaling and sugar processing and refining, in addition to steel.

Rank-and-file resolutions, however, call for nationalization after 1950 of distribution, building, shipbuilding, engineering, textiles, armaments, chemicals, foundries, water supplies, building materials, sugar refining, flour milling and aluminum and light alloy production. Heaviest pressure has been on the executive body to expand its program to include at least the socialization of the chemical and shipbuilding industries.

A compromise may be evolved whereby the party's platform will contain a plank authorizing the Labor executive body to introduce such nationalization measures as the circumstances warrant between 1950 and 1955, the year when another general election is scheduled.

Western Germany

OF THE dozen Germans to serve as steel trustees pending an industry reorganization and pending a German parliament's decision on public or private ownership, nine are approved by trade unions which strongly favor nationalization.

Many German industrialists are decrying this situation, although they are countered with the argument that the trustees' powers will be limited, as they will take orders from the Western Allies' Ruhr Authority now being set up. The industrialists, however, point out that the pro-nationalization forces are even more deeply entrenched. Most managers of the 25 new steelmaking companies separated from their parent firms in 1946 by the British are still in power, have socialistic leanings and are likely to figure prominently in managerial arrangements under the new vertical organization.

Production of rolling mills in Bizonia jumped by 16,000 tons to 454,430 tons in February. Ingot output increased by 11,000 tons to 662,247 tons during the month. Most mills, working at about 60 per cent capacity, cannot maintain higher rates because of power and labor shortages. Prospects for relieving this situation are seen in the announcement that Economic Co-operation Administration is considering a large public works program in Western Germany for the area's 10 million idle displaced persons. "Public works" may include public power plants and housing. Lack of living quarters in industrial areas is cutting into the labor supply.

British, French and American representatives are still discussing the dismantling question. Predictions are current that an agreement will be

reached to provide that 150 plants be removed from the list of facilities to be torn down for reparations. ECA had recommended that 167 plants be saved. Also up for study at the British, French and American meeting is relaxation of controls to permit Western Germany to build merchant ships not exceeding 9000 tons in size and to allow production of aluminum and magnesium.

Plan To Develop Chilean Mines

BETHLEHEM Steel Corp. officials for the present are withholding comment on a contract which its subsidiary, Bethlehem Chile Iron Mines, is reported to have entered into with the Compania de Acero del Pacifico (Pacific Steel Co.) of Santiago, Chile, by which the former will supply the latter with iron ore at cost for a 20-year period.

The contract is understood to call for development of Bethlehem's El Romeral iron ore deposits in La Serena Department, Chile. Development is to begin within three years and include construction of railway and port facilities, and the supplying of machinery and housing, all involving an investment of $9 million. Of this amount, Bethlehem will contribute $6,500,000, it is said, and Acero del Pacifico, $2,500,000.

Bethlehem Chile will mine 1 million tons of ore annually, of which it will deliver to the Chilean steel company 350,000 tons at the start and export the balance.

Brazilian Tungsten Surveyed

SURVEY just completed is the basis for a statement Brazil may again become an important supplier of tungsten to the United States, possibly regaining its wartime position in this respect when it supplied 20 per cent of U. S. tungsten imports.

Brazilian tungsten deposits are largely undeveloped, however, and require considerable capital investment. The Brazilian survey shows there are more than 100 workable deposits within the Serido region of northeast Brazil. Only about 45 are now being worked. One working turns out about ten tons of ore weekly and has been shipping about $4,500,000 worth annually since it was opened in 1942.

It is believed annual production in the area could be increased tenfold if development were pushed to permit modernized mining.

Projected establishment of smelters at the Paulo Afonso Falls on the Sao Francisco river, where hydroelectric developments are being built, is expected to speed development of mining throughout northeastern Brazil.

British Steel Plants Expanding

Program, to cost at least $1 billion, will by 1953-54 establish pig iron capacity at about 14,560,000 net tons and ingot potential at around 20.7 million tons annually

BRITISH iron and steel plant expansion and modernization program which now is actively under way will, according to documents placed at the disposal of STEEL by the British embassy at Washington:

1. Cost $1 billion or more; 2. establish pig iron capacity at about 14,560,000 net tons by 1953-54; 3. establish steel ingot capacity at about 20.7 million tons by 1953-54; 4. increase home iron ore production by about 6.7 million tons annually; 5. expand coke output by 3.3 million tons a year; 6. expand coking coal production by 5.6 million tons a year.

Home, Foreign Needs To Be Met—With 20.7 million tons of steel ingot capacity, actual expected output is about 19.6 million tons of ingots. This will take care of estimated requirements of British consumers of around 15,680,000 tons annually, leaving nearly 4 million tons for direct steel exports.

On the basis of blast furnace capacity of 14,560,000 net tons, it is figured, output of steelmaking iron will be 11.2 million tons and production of foundry grades about 3,080,000. In addition to obtaining 6,720,000 more tons of iron ore from home deposits, the plan calls for an increase in iron ore imports of 4,480,000 tons annually. Expansion of home ore production already is well under way. Contracts for the additional coke ovens also have been placed and the work started.

How the capacity target of 20.7 million tons of steel ingots compares with prewar and current output is shown by the following years' ingot production figures (not including castings): 1935, 11,088,000 tons; 1937, 14,560,000 tons; 1939, 14,784,000 tons; 1945, 13,263,000 tons; 1946, 14,280,000 tons; 1947, 14,280,000 tons; 1948, 16,240,000 tons (estimated).

Wales Has Large Expansion—Largest individual plan is for the Margam, South Wales, plant of Steel Co. of Wales, scheduled for completion in 1952. Additional production there is to include capacity for 481,000 tons of coke, 492,000 tons of pig iron, 1,176,000 tons of ingots, 102,000 tons of hot coiled strip, 56,000 tons of hot-finished sheet, 39,000 tons of rails and sleepers and 336,000 tons of cold-finished sheet.

The plants involved in the expansion and modernization program, with a general description of the nature of the improvements of each plant, are set forth as follows in a statistical bulletin recently prepared by the British Iron & Steel Federation:

STEWARTS & LLOYDS
At Corby—New coke ovens and ore preparations plant, completed. New open hearth melting shop, additional tube plant and mill reconstruction in progress. Site preparation begun for new blast furnaces, bessemer plant and continuous billet mill.
At Clydesdale—Reconstruction of melting shop, partially completed.
At Mossend, Calder and Tollcross—New installation and reconstruction of tube plant.
At Bilston—Ore handling equipment, completed.
At Halesowen and Bromford—Modernization of tube plant.

LANCASHIRE STEEL CORP.
At Irlam—New coke ovens and ancillary plant. Site preparation begun for new wire rod mill.

RICHARD JOHNSON & NEPHEW
At Manchester—Reconstruction of wire rod mill, completed.

JOHN SUMMERS & SONS
At Shotton—New melting shop, modernization of mills and ancillary plant in progress. Erection of new coke ovens, ore unloading and preparation plant, new blast furnaces.

UNITED STEEL COS.
At Scunthorpe—New melting shop, completed. Modernization of mills and ancillary plant, new coke oven battery, new ore preparation plant.
At Treeton—New coke ovens.
At Rotherham—Modernization of mills and ancillary plant.
At Workington—Ore preparation plant, completed. Modernization of rail finishing equipment.

JOHN LYSAGHT
At Scunthorpe—New coke oven battery, provision of ore crushing plant and services, erection of new blast furnaces, rebuilding of open hearth plant, new cogging mill, continuous billet mill and continuous wire rod mill.

RICHARD THOMAS & BALDWINS
At Scunthorpe—New ore preparation plant, new blast furnaces, electrification of mills.
At Ebbw Vale—New coke ovens, additional open hearth steel furnace, new electrolytic tinning plant, completed.

CONSETT IRON CO.
At Consett—New coke ovens, completed. New ore unloading plant, new blast furnace, reconstruction of open hearth shop and reheating furnaces and new slabbing and blooming mill.

DARLINGTON & SIMPSON
At Darlington—New shape mill, completed.

DORMAN, LONG & CO.
At Cleveland—New ore unloading, preparation and sintering facilities, completed. Two new blast furnaces.
At Lackenby—Site work commenced for new open hearth shop and broad flange beam mill.

SKINNINGROVE IRON CO.
At Saltburn—New blast furnace, new steel furnace, improvements to rolling mills.

SOUTH DURHAM STEEL & IRON CO.
At West Hartlepool—Extension and enlargement of melting shop, reconstruction of cogging mill.

COLVILLES
At Clyde—New coke ovens, new blast furnace, completed. Ancillary plant.
At Clydebridge—Extension of melting shop and installation of open hearth tilting furnaces for hot metal.

ROUND OAKS STEELWORKS
At Brierly Hill—New melting shop, replacement of cogging mill and finishing mill, almost completed.

STEEL CO. OF WALES
At Margam—New ore unloading and preparation plant, new coke ovens, new blast furnaces, new melting shop, continuous hot strip mill and cold reduction mill.

GUEST, KEEN & NETTLEFOLD
At Cardiff—New continuous rod and merchant bar mill.

JOHN BAKER & BESSEMER
At Rotherham—New open hearth furnace, completed.

ENGLISH STEEL CORP.
At Sheffield—Reconstruction of foundries

and ancillary plant, installation of new electric furnaces.

FIRTH VICKERS STAINLESS STEELS
At Sheffield—New mills and ancillary plant.

ARTHUR LEE & SONS
At Sheffield—New mills and ancillary plant.

PARK GATE IRON & STEEL CO.
At Rotherham—New ore handling equipment.

Capital Outlays To Drop

Second-half expenditures may be down 14 per cent; off slightly for year

A DECLINE in expenditures by American business for new plant and equipment is expected in the latter half of 1949 in contrast to the usual seasonal upswing, according to a joint survey of the Department of Commerce and the Securities & Exchange Commission. A drop of about 14 per cent was forecast.

U. S. business plans to spend $18.3 billion on new plant and equipment in 1949, nearly as much as it did in the record-breaking year of 1948 when the total was $19.2 billion. Capital outlays planned for 1949 are higher in dollar terms than in any year except 1948 and are about equivalent in terms of physical units to the level of 1947. The investment programs were reported generally as of mid-February—subsequent to the sharp break in commodity prices which occurred in the early weeks of that month.

Expenditures Up—In the first quarter of this year, total outlays for producers' capital are estimated at $4.7 billion, about 12 per cent above the like quarter of 1948 when business hesitancy temporarily limited investment commitments. With rough adjustments for the seasonal movement, this rate is about the same as that prevailing at the peak reached in the final quarter of last year. For the second quarter, business plans point to a capital expenditure of $4.8 billion, about on a par with the like quarter of last year. Expenditures in the first half of this year, therefore, are expected to be about 5 per cent above those for the first half of 1948.

Declines from 1948 to 1949 in capital outlays anticipated by manufacturing companies and concerns in the commercial and miscellaneous group are balanced to some extent by the higher expenditures planned by utilities and the railroads. About 70 per cent of the total capital outlays last year were for machinery and other equipment and the remainder for new construction.

The accompanying table is included in the report, showing the historical record since 1938 and the estimates for 1949.

CAPITAL OUTLAYS BY UNITED STATES BUSINESS, 1939-1949

(Millions of Dollars)*

	Manufacturing	Mining	Railroad	Other Transportation	Elec. & Gas Utilities	Commercial & Misc.	Total
1939	1,930	380	280	280	480	1,850	5,200
1940	2,580	560	440	390	550	1,980	6,490
1941	3,400	680	560	340	710	2,490	8,190
1942	2,760	410	540	260	680	1,470	6,110
1943	2,250	360	460	190	540	730	4,530
1944	2,390	500	580	280	490	970	5,210
1945	3,210	440	550	320	630	1,480	6,630
1946	5,910	560	570	660	1,040	3,300	12,040
1947	7,460	690	910	800	1,900	4,430	16,180
1948	8,340	800	1,320	700	2,680	5,390	19,230
1949†	7,240	820	1,450	650	3,130	5,010	18,310
1948 Qtrs.							
1st	1,800	180	270	180	500	1,240	4,170
2nd	2,140	200	310	190	640	1,340	4,820
3rd	2,090	200	320	170	690	1,360	4,830
4th	2,320	220	410	170	850	1,440	5,410
1949 Qtrs.							
1st†	1,940	180	390	160	720	1,290	4,680
2nd†	1,860	190	410	180	790	1,360	4,780

* Excludes agriculture. Figures are rounded and will not necessarily add to totals. † Figures are estimated, based on anticipated capital expenditures of business.

Acetylene Group To Hear Mundt

SEN. Karl E. Mundt, (Rep., S. D.), co-author of the Mundt-Nixon bill requiring the American Communist party to register its membership with the Department of Justice, will be one of the speakers at the International Acetylene Association's convention in Pittsburgh, Apr. 25.

Among the subjects to be examined in the technical sessions are: Use of oxy-acetylene for scarfing and gouging; flame hardening; applications of the oxy-acetylene flame for heating, straightening and forming; explosion pressures in industrial piping systems; cutting of stainless steel; heavy cutting in the steel mill; and shape-cutting in railroad shops.

Sponsors Sales Training Clinic

TO MEET the challenge of a returning buyer's market, the Detroit Sales Executives Club is sponsoring its first annual sales training clinic. Designed for those now active in sales work or interested in salesmanship, the clinic will include a course of five weekly meetings from 6:30-8:00 p. m., beginning Wednesday, Apr. 27. Registration fee is $25 per person.

Calendar of Meetings

Apr. 11-12, American Machine Tool Distributors Association: Meeting, Hotel Oglethorpe, Savannah, Ga.

Apr. 11-12, American Zinc Institute: 31st annual meeting, Hotel Statler, St. Louis. Institute's Galvanizers Committee will meet concurrently with the general convention. Institute headquarters are at 60 E. 42nd St., New York.

Apr. 11-12, American Institute of Electrical Engineers: Conference on industrial application of electron tubes, Hotel Statler, Buffalo. Institute headquarters are at 33 W. 39th St., New York.

Apr. 11-13, American Society of Lubrication Engineers: Annual convention, Hotel Statler, New York. Lubrication show will run concurrently with the convention.

Apr. 11-14, National Association of Corrosion Engineers: Fifth annual conference and exhibition, Netherland-Plaza Hotel, Cincinnati. Association headquarters are at 905 Southern Standard Bldg., Houston.

Apr. 11-14, Society of Automotive Engineers: Aeronautic and air transport meeting and aircraft engineering display, Hotel New Yorker, New York. Society headquarters are at 29 W. 39th St., New York.

Apr. 11-15, American Society for Metals: Western metal congress and exposition, Shrine Civic Auditorium, Los Angeles. Society headquarters are at 7301 Euclid Ave., Cleveland.

Apr. 12-13, American Management Association: Production conference, Waldorf-Astoria Hotel, New York. Association headquarters are at 330 W. 42nd St., New York.

Apr. 18-20, Open Hearth Steel Committee and Blast Furnace, Coke Oven and Raw Materials Committee, Iron & Steel Div., AIME: Thirty-second annual conference, Palmer House, Chicago. Institute headquarters are at 29 W. 39th St., New York.

Apr. 18-20, Illinois Institute of Technology: Eleventh annual Midwest power conference, Sherman Hotel, Chicago. Conference is also sponsored by many other institutions.

Apr. 19-20, Magnesium Association: Annual spring meeting and product exhibit, Edgewater Beach Hotel, Chicago.

Apr. 19-21, American Institute of Electrical Engineers: Southwest district meeting, Baker Hotel, Dallas.

Apr. 20-23, American Society of Civil Engineers: Spring meeting, Oklahoma City, Okla. Society headquarters are at 33 W. 39th St., New York.

Apr. 22-23, Colorado School of Mines: Fifteenth annual engineers' day, Golden, Colo.

Apr. 23, Purdue Chapter of American Society for Metals: Symposium on machinability, Lafayette, Ind.

Apr. 25, International Acetylene Association: Meeting, Hotel William Penn, Pittsburgh. Association headquarters are at 30 E. 42nd St., New York.

Apr. 25-27, Radio Manufacturers Association and Institute of Radio Engineers: Fourth annual spring meeting, Benjamin Franklin Hotel, Philadelphia.

Apr. 26, American Ordnance Association: 31st annual meeting, Hotel Ambassador, Los Angeles. Los Angeles committee has as its secretary Evan White, 2700 Tweedy Blvd., South Gate, Calif.

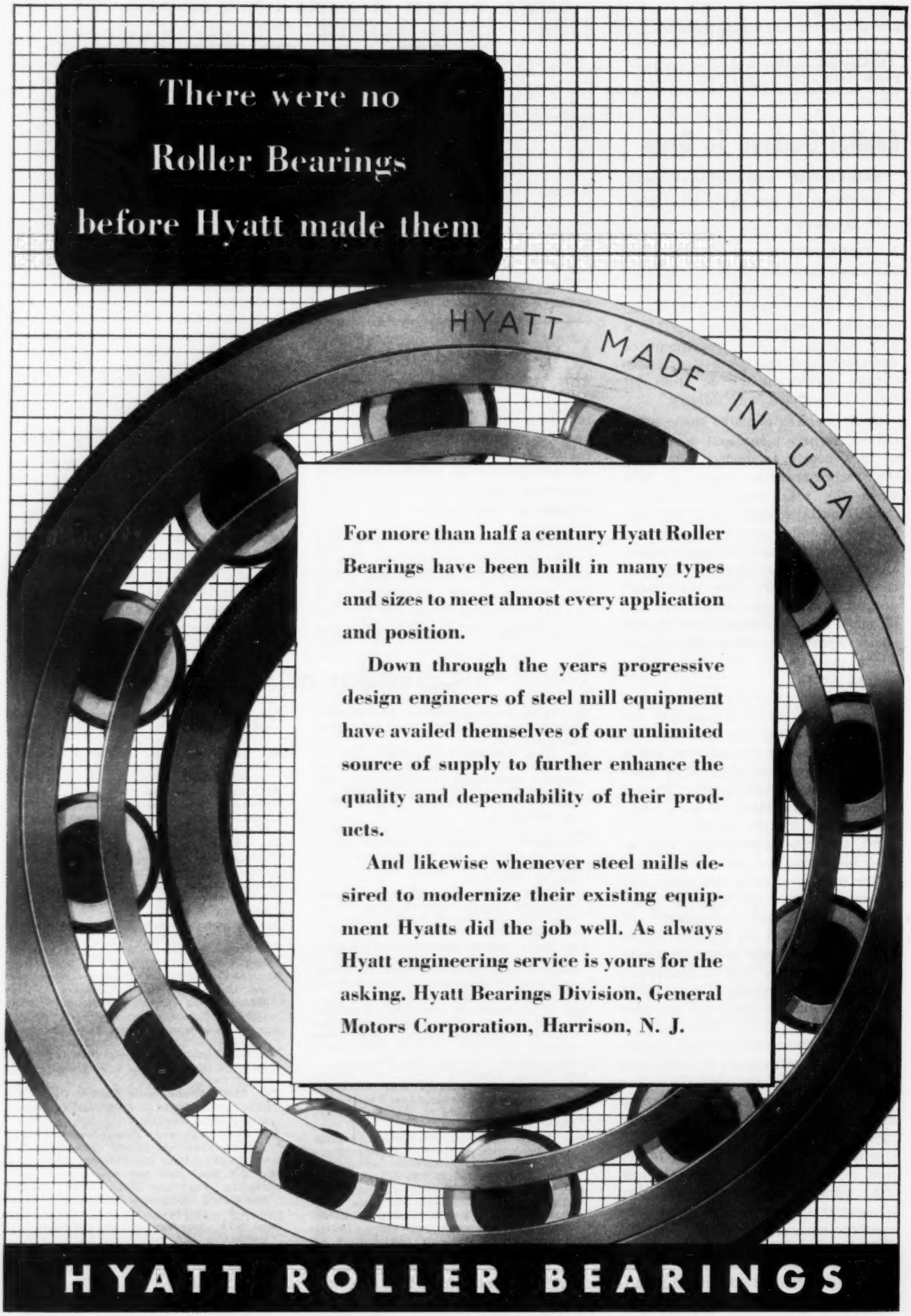
Apr. 26-27, Westinghouse Electric Corp.: Annual machine tool electrification forum, Statler Hotel, Buffalo.

May 2-5, American Foundrymen's Society: Foundry congress. Society headquarters are at 222 W. Adams St., Chicago.

May 5-6, Rail Steel Bar Association: Annual meeting, Edgewater Beach Hotel, Chicago. Association headquarters are at 38 S. Dearborn St., Chicago.

May 9-12, American Mining Congress: Coal convention and exposition, Public Auditorium, Cleveland.

May 13, American Institute of Electrical Engineers: Conference on electric equipment for materials handling bridges, Hotel Cleveland, Cleveland.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And likewise whenever steel mills desired to modernize their existing equipment Hyatts did the job well. As always Hyatt engineering service is yours for the asking. Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.
HYATT ROLLER BEARINGS

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

List price reductions sweep through auto industry, as Ford and Nash pass along savings in material costs. Takes wind out of union demands for straight wage rate increases

DETROIT

SWEEPING like a spring breeze through the motor industry have been new list price reductions, of small proportions but continuing the trend started in February. As had been expected, Ford followed the General Motors pattern by trimming from $12 to $30. Higher amounts applied to Mercury, from $80 to $120, and to Lincoln, $100 on all models. Certain truck models are reduced $10 to $40, with no change in tractor quotations. The action was described as having been made possible through increased availability of materials and small decreases in prices of some materials, leading to lowered production costs. Meanwhile, firm production schedules have been set for June, July and August at the highest monthly rate since April, 1937.

On the eve of negotiations covering a new contract with the UAW-CIO, the move might be considered as an attempt at forestalling any outsize demands for wage increases, although union officials have given no indication of asking much beyond social security benefits. For the record, the union, commenting on the "token price reductions," said it was "glad to see this gesture by the company of passing on savings to customers."

Nash Cuts—Nash has followed suit with reduction ranging from $20 to $120 on its 600 series and Ambassador models, attributing the step to better material supply, increased production volume, lower material costs and the fact production schedules have been uninterrupted for a number of months. At the same time, Nash president George W. Mason said March set an all-time record in volume of retail sales, in the form of "deliveries to customers" and not just shipments to dealers. Schedules are being increased progressively for April, May and June.

With Packard now changing over its models and not scheduled to announce for another month, this leaves only Chrysler, Hudson and Studebaker holding the price line. It is expected around Detroit there will be announcements from all three momentarily. After all, if one producer can trim prices because of lower material costs, then the pressure is on all the rest, since materials eventually cost practically the same for all manufacturers. Car builders are very cagey about indicating exactly where they have realized savings in materials, because they naturally realize such savings can be enjoyed only temporarily and there is no need passing the word around for the benefit of competitors. Actually there have been some reductions in standard parts, in castings and in finished steel where previously it has been necessary to buy fill-in tonnages of the conversion type.

Dealers Concerned—Dealers have a vital concern in revised factory list prices because stocks of cars in their hands were bought at old prices and they are not always protected by rebates from factories in the event of reductions although such a policy is general industry practice. In the case of recent changes by Willys, for example, dealers and distributors relinquished their rights to rebates on units in stock more than 30 days for dealers, and 45 days for distributors. Kaiser-Frazer dealers had something over 19,000 cars in stock when price cuts were made two weeks ago, and they will receive about $4.5 million in the form of rebates. General Motors Divisions' dealers were reimbursed for all cars in stock or in transit at the time of the price change Feb. 28. Ford's dealers contracts are believed to contain like provisions.

There is speculation heard over the possible effects of the sharp reductions made by Kaiser-Frazer. Company officials claim that by trimming $333 from the price of the Kaiser Special, it will be moved down into the so-called mass market and enjoy wider reception. At the same time it must be remembered the mass market is where mass competition is toughest, which could presage an even rougher battle for K-F. In other words, it may have moved out of the frying pan into the fire.

Mergers Rumored — Executive changes at K-F have rekindled merger rumors linking the company to others in the industry. The latest involved Willys-Overland and Continental Motors. According to the gossip, a meeting was held in Miami recently, attended by representatives from the three companies and from First Boston Corp., said to be closely allied with K-F financial fortunes, and Kuhn, Loeb & Co., Willys-Overland bankers. There was general denial of the report from the companies involved, although a Detroit newspaper recently sought to determine the truth of a tip that James D. Mooney, Willys president, was leaving his position in connection with the merger talk. Logically, Mr. Mooney did not care to dignify the query with an answer one way or the other.

Continental Motors fits into the picture since it builds engines for both Willys and K-F, now leasing most of its Detroit plant to the Willow Run producer for engine production. However, C. J. Reese, Continental president, brushed aside any comment on merger possibilities. Probably the direction of automobile retail sales in the next 60 days will determine the validity of this hinted combination of resources. If they hold strong or move up, the idea will be dismissed; if they move the other way, there may be some action.

Hudson Optimistic—There is little

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1949	1948
January	445,092	422,236
February	443,734	399,471
March	544,388*	519,154
April		462,323
May		359,996
June		454,401
July		489,736
August		478,186
September		437,181
October		516,814
November		495,488
December		514,337
12 mos.		5,549,323

* Preliminary.

Estimate for week ended:

	1949	(Same week) 1948
Mar. 19	120,741	115,556
Mar. 26	121,341	107,284
Apr. 2	117,759	105,132
Apr. 9	122,000	103,004

Ward's Automotive Reports

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BROTHERS FORD: Youngest of the Ford brothers, William Clay, is welcomed into the automobile business by Benson, left, and Henry II, center. He is beginning his career at Ford Motor Co. in the Sales & Advertising Division but will spend considerable time with each of the staff and operating groups of the company. Young Bill is 24, has been a director of the company since June, 1948

gloom reflected in official views expressed at Hudson over the sales outlook. Retail sales during the first three months of the year constituted the greatest wintertime volume the company has experienced in 20 years, and the first two months alone were 55 per cent ahead of the same period last year, totaling 24,637 against production of about 33,000. Recognizing the business is becoming responsive to seasonal trends for the first time since the war, however, Hudson sales chiefs, believe 1949 will be a "splendid, but a more normal one."

Output at 20-Year Peak

AUTO production for March, United States and Canada, is estimated at 544,388 units, a 20-year record monthly total, exceeded only by March, 1929. It brings first-quarter output to better than same period a year ago.

350 Ask for Training

NEARLY 350 employees at the Ford Rouge plant applied for foremen training program during the first few weeks an expanded management development program has been in operation. Of the first group of applicants, 18 already have been assigned as trainee foremen in such operations as the steel plant, blast furnaces, coke ovens, casting machine shop, production foundry, locomotive repair, plastic inspection and final assembly line. Another group of 57 has been reviewed.

Trainee foremanship is one step of a ladder the company expects will provide an avenue of advancements from unskilled worker to potential management level. Apprenticeship training might be the first step, then trainee foremanship, training for foremen to make them better managers, and finally the production management program which furnishes advance training for selected supervisors.

Currently, the training department is providing nearly 25,000 student-hours of instruction per month, and as the program expands and training aspects are intensified this figure will more than double. Here is how a young man with ability and ambition might expect to advance through the ranks to a top supervisory position: As a company employee he can apply for apprentice training in one of the 18 skilled trades for which instruction is offered. He will spend 8000 hours, or four years, in shop work at his trade and another 400 hours taking related classroom work in such subjects as mathematics, drawing, shop theory, metallurgy, chemistry, physics, etc. Upon completion of this he will be a journeyman. After three to five years as a journeyman, if his labor, attendance, application and conduct record is good, he is eligible to apply for training to become a foreman. It is not necessary to have had apprentice training to become a trainee foreman, but the company does require a trade school certificate, a high school diploma or its equivalent from all trainee foremen who were not former apprentices.

As a trainee foreman he is given about 100 hours of instruction in personnel administration, quality, cost management, production, use of staff services, company development, and tools, machines, equipment and materials, which can be completed in about six months, along with work as a trainee supervisor. He is then eligible for a regular foreman's job as openings occur.

Once a foreman, he is given an additional hour of training a week in the same fields as the basic pre-foreman training but along more advanced lines. He also attends monthly management meetings to keep abreast of operations and policy matters. As a supervisor and if between 25 and 35, a foreman can enroll in the production management program which requires three years of class room study and related work experience to complete. There are 104 now enrolled in this activity, the first class completing its company-required work in May. Of this group, 13 are former apprentices. Future company top executives will be recruited largely from the ranks of supervisors.

Reducing Engine Noise

ENGINE noise reduction is a constant goal of engineers. The new V-8 power plants of Olds and Cadillac have made important strides in this direction. In the current Pontiac sixes and straight eights, the pitch and speed of fan blades has been lowered to reduce whine and the silencers have been made more effective in quieting the air intake system. Before entering the carburetor, all air drawn into the engine passes through four silencing chambers. The first is a "hiss" chamber, improved by the use of a neoprene coating. Almost at the same time, the vibrating air column enters high, intermediate and low note tuning chambers which dampen sound vibrations spanning the audible range.

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12 SPINDLE TYPE "K"
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Twin Spindle Application
High Spindle Speeds
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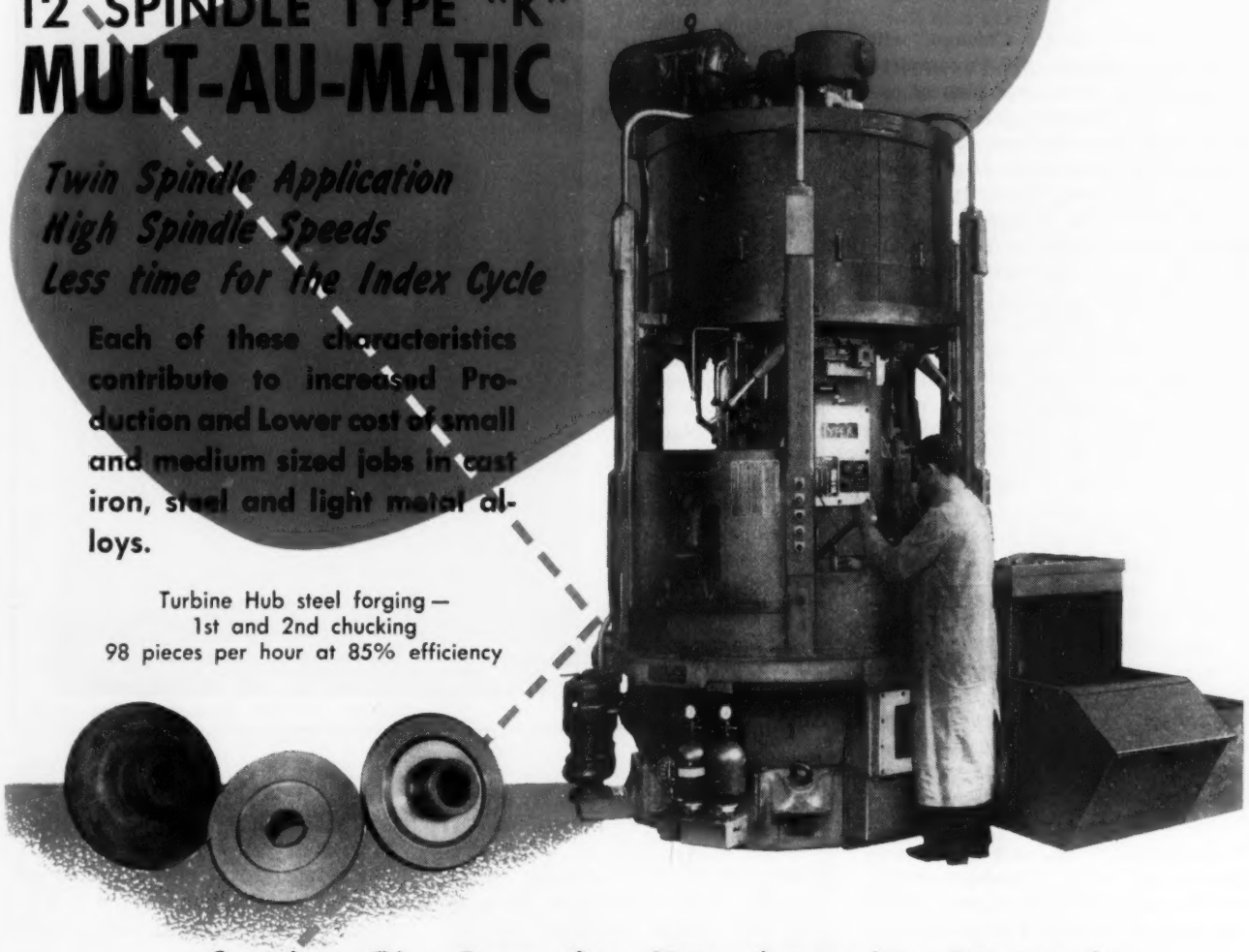
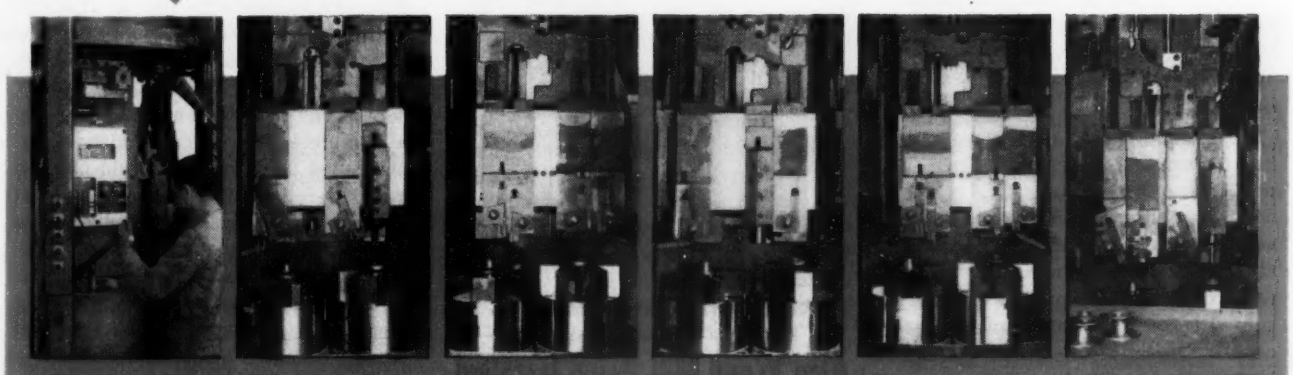
Each of these characteristics contribute to increased Production and Lower cost of small and medium sized jobs in cast iron, steel and light metal alloys.

Turbine Hub steel forging —
1st and 2nd chucking
98 pieces per hour at 85% efficiency



Setting The Pace for Manufacturing Economies

There are 19 operations combined in the 1st and 2nd chuckings. Each index of the machine delivers a finished piece. When writing for information refer to ad XK



THE BULLARD COMPANY
BRIDGEPORT 2, CONNECTICUT

Borg-Warner Expands

Corporation in 1949 will complete its $40 million, four-year plan of modernization

BORG-Warner Corp., Chicago, will spend $5 million in 1949 to complete its $40 million, four-year plan of expansion. Additional capital expenditures to provide for manufacture of automatic transmissions also are being contemplated. Two types soon will be offered to the automobile industry, with prospect of adoption toward the end of the year.

Borg-Warner acquired a $440,000, 110,000-sq ft plant in Kalamazoo, Mich., on Jan. 1, 1949, for the use of the corporation's Ingersoll Steel Division in the manufacture of domestic heating furnaces. Another $185,000 plant at Ellwood City, Pa., was acquired for the use of Ingersoll in the assembly of furnaces. Erection of a $2,350,000 plant and laboratory for Pesco Products Division at Bedford, O., was begun in 1948. It will be ready for occupancy by next summer.

The following diversified product groups accounted for Borg-Warner's 1948 sales: Automotive, 49.45 per cent; aviation, 1.29 per cent; agricultural, 9.23 per cent; household appliances, 29.06 per cent; household utilities, 2.66 per cent; miscellaneous, 8.31 per cent.

The company had a peak year in 1948 in net sales of $309,253,830, in net earnings of $29,714,993 and in employment of 24,570 as of last December. Net earnings in 1947 were $24,523,148.

Clark Equipment To Centralize

CLARK Equipment Co., Buchanan, Mich., is attempting to solve the problem of high operating expenses with a consolidation and centralization program.

The company has already sold its Drill Division to Republic Drill & Tool Co. (STEEL, Mar. 28, p. 54) and is building a new plant near Jackson, Mich., which will consolidate existing operations. In recent years drill sales accounted for only about 1.5 per cent of Clark's business. To be co-ordinated at the new plant will be Clark's replacement parts business for industrial trucks and motor truck transmissions, an activity which has shown a marked growth in the last ten years. The company now has plants at Jackson, Buchanan, Battle Creek and Berrien Springs, Mich.

Clark spent $1 million last year on new machinery and equipment. Its net earnings totaled $5,441,000 on sales of $75,150,000. Sales in 1947 totaled $61,350,000. In addition to transmissions and industrial trucks, the firm makes truck and bus axles and many other products.

ON THE JOB: Louis C. Edgar Jr., recently elected president of E. W. Bliss Co., Toledo, O., is tackling production problems at first hand. Here he is inspecting the assembly of a new 800-ton enclosed press being built for a large farm equipment manufacturer. Mr. Edgar was wartime general manager of Blaw-Knox's Martins Ferry Division and directed the transformation of an abandoned tin mill into an efficient 3000-employee war emergency operation

Prestole Corp. Survives Fire

PRESTOLE Corp., Toledo, O., maker of fastening devices, was apparently out of business on Mar. 17 after a disastrous fire, but within ten days the firm was in production again as the result of co-operation by other Toledo companies, employees and a competitor.

William Longhran, general manager of Production Metal Stamping Co., and Fred Hansen, general manager of N. M. Hansen Mfg. Co., put their plant facilities at the company's disposal. Shakeproof Inc., Chicago, a competitor, offered assistance.

Alan Wood Mill Being Installed

ALAN WOOD Steel Co., Conshohocken, Pa., expects to have the 30-in. strip mill purchased from Jones & Laughlin Steel Corp. in operation at Ivy Rock, Pa., by next December.

The unit was formerly producing at J & L's Otis Works in Cleveland, but was sold last year because of expansion in capacity of other existing facilities at Otis. Alan Wood will spend an estimated $8.9 million to re-install and purchase the mill. The company will have spent an additional $5.8 million by the end of this year on other improvements for 1948-49. One project already completed is installation of equipment for production of stainless clad steel.

Opens Detroit Warehouse

ESTABLISHMENT of a Detroit branch warehouse by Ohio Stainless & Commercial Steel Co., Cleveland, is announced by Paul Keller, president. The new warehouse will carry a complete line of cold-finished and hot-rolled carbon bars, cold-finished and hot-rolled alloy bars, cold-rolled and hot-rolled carbon sheets, Osco Kel-Cast Iron and Bristol brass.

"Demand for our products in the Detroit area has been expanding steadily, contrary to the general trend," declares Mr. Keller. "Opening of the new Detroit warehouse will enable us to provide quicker service to our customers in that area. The new facility will carry a complete line of products and we will be in a position to fill orders immediately."

The new branch will be located at 6970 West Jefferson Ave. and will operate as the Osco Steel Division.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Eaton Mfg. Co., Cleveland, has made arrangements with McKinnon Industries Ltd., St. Catharines, Ont., whereby the Eaton two-speed axle units will be produced in Canada of Canadian materials and by Canadian labor. Arrangements were made last year, but retooling of the McKinnon plant prevented actual shipments until recently.

—o—

American Washer & Ironer Manufacturers Association, Chicago, reports factory sales of standard-size household washers in February were 43 per cent below sales of the like month last year. February sales totaled 208,500, compared with 177,900 in January and 367,909 in February, 1948. Ironers sold in February aggregated 28,250, against 28,000 in January.

—o—

United States Rubber Co., Chicago, expects to complete construction of a new warehouse at S. Pulaski Rd. and 42nd St., Chicago, by May 15.

—o—

Standard Reamer & Tool Co., maker of reamers, cutters and special tools, has changed its name to Special Cutter & Tool Co. and has moved from Detroit to 401 Salliotte St., Ecorse, Mich.

—o—

Liquid Carbonic Corp., Chicago, has purchased Paschall Oxygen Co., Philadelphia, which becomes the Paschall Oxygen Division of Liquid Carbonic. F. H. Lewis will supervise operations. Paschall, formerly a subsidiary of Fels & Co., makes oxygen, hydrogen and nitrogen.

—o—

American Colloid Co. has moved its general offices from 363 W. Superior St. to Merchandise Mart Plaza, Chicago.

—o—

Charles A. Freeman has resigned from A. P. Green Fire Brick Co. to form his own firm at Canyon City, Colo. The new corporation will acquire clay deposits, buildings and equipment now at Canyon City.

—o—

Banner Mfg. Co., Milwaukee, has been acquired by David V. Uihlein who will act as executive director. Formerly known as Banner Products Co., the new organization will continue to make resistance welders and brazers.

—o—

General Motors Corp. reports that as of the end of 1948 it was owned by 434,684 stockholders living in every state in the nation, the District of Columbia, six U. S. possessions and 77 foreign countries.

—o—

Cochrane Corp., Philadelphia, manufacturer of water conditioning equipment and steam specialties, has acquired most of the capital stock of Liquid Conditioning Corp., Linden, N. J., maker of conditioning apparatus for water and other liquids. Liquid will operate as a subsidiary of Cochrane.

—o—

Southern States Iron Roofing Co., Savannah, Ga., manufacturer of metal roofing and distributor of building materials, has opened a new branch warehouse in New Orleans, its tenth.

—o—

Butterfield Division of Union Twist Drill Co., Derby Line, Vt., maker of taps, dies, reamers and other cutting tools, has appointed Johnson-deVou Inc., Boston, as distributor for the Boston area. Johnson-deVou offices in Worcester and Springfield, Mass., will also carry the Butterfield line.

—o—

Office of International Trade has prepared a hand book, "Foreign Marks of Origin Regulations," which tells American business men how to mark merchandise so that it will be acceptable to the customs authorities of other countries. The book is available for 35 cents from any Department of Commerce field office or from the Superintendent of Documents, Washington 25.

—o—

Hercules Motors Corp., Canton, O., has licensed Hispano Suiza of France to build two series of diesel engines for application in commercial vehicles and industrial machinery in France.

—o—

Detroit Plating Industries, Detroit, has been acquired by Louis S. Morse Jr. who becomes president and general manager.

—o—

Hyster Co., Portland, Oreg., has appointed Machinery & Supplies Co. Inc., Kansas City, Mo., as distributor of its lift trucks, straddle trucks and mobile cranes in Kansas, western Missouri and northern Oklahoma.

—o—

Robberson Steel Co., Oklahoma City, Okla., currently celebrating its 40th anniversary, has opened a new reinforcing steel fabricating shop which adds 25,000 feet to plant facilities.

—o—

F. L. Jacobs Co., Detroit, maker of automotive parts, vending apparatus and washing machines, is ceasing manufacturing operations in Indianapolis and Louisville, Ky., and transferring these operations to its Detroit and Traverse City, Mich., plants.

—o—

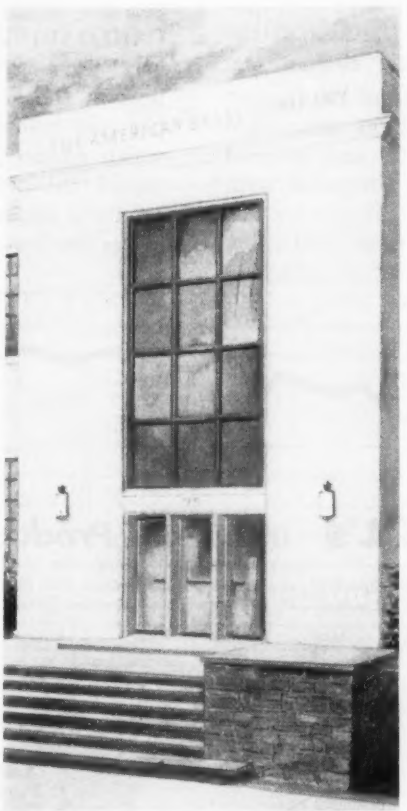
Baker Brothers Inc., Toledo, O., manufacturer of drilling, boring, grinding and special production machinery, has appointed Machinery Associates Inc., Philadelphia, as its dealer in the Philadelphia area.

—o—

Ingalls Iron Works Co., Birmingham, structural steel fabricator, has opened offices in the Continental Illinois Bank Bldg., Chicago, with Frank Atchison Jr. in charge.

—o—

Mid States Corp., Chicago, holding corporation for a midwestern trailer manufacturing, finance and insurance network, has purchased Pan-American Trailer Coach Co., Monrovia, Calif., for about $1 million.



BRANCH HEADQUARTERS: Sales and service activities of the American Brass Co.'s Ansonia Branch, formerly carried on at the company's headquarters in Waterbury, Conn., have been transferred to this new office building adjoining the plant at Ansonia, Conn. A. W. Wilkinson is vice president in charge of the Ansonia Branch

The Business Trend

DOWNTREND in business activity was checked during the week ended Apr. 2, as STEEL's industrial production index climbed 2 points from the preceding week and reached a preliminary 169 per cent of the 1936-1939 average. Largest single factor in the rise was the gain in freight carloadings as the miners' walkout ended.

STEEL — Output of steel for ingots and castings moved contrary to the direction of the index as the industry's operating rate fell off 1 point in the week ended Apr. 2. Since production was at 100 per cent of rated capacity during the week, steelworks operations remained exceptionally high with the rate for March averaging in excess of 100 per cent.

AUTOMOBILES — Outturn of passenger cars and trucks dropped to 117,759 units during the week ended Apr. 2 from the revised total of 121,341 for the preceding week. Continuing frame shortages at three divisions of a major builder and suspension of assemblies for model changeover by another auto maker caused the decline. Price cuts, ranging from "token" reductions to sizable slashes, have been announced by five manufacturers since the first of the year as the industry readies itself for competition.

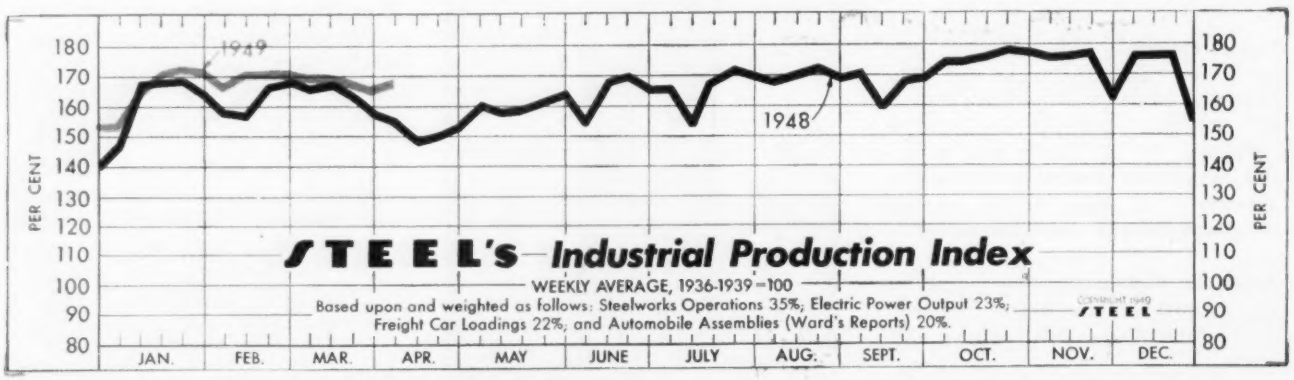
PRICES—Weekly wholesale price index of the Bureau of Labor Statistics continued its slight downward movement in the week ended Mar. 29 and reached 158.1 per cent of the 1926 average, compared with 158.2 per cent the preceding week. The index for metals and metal products dropped more noticeably in the same period to 177.1 per cent of the 1926 average from 177.6 per cent in the preceding week.

COAL—Production of bituminous coal aggregated 2,370,000 net tons during the week ended Mar. 26, the slump resulting from the 2-week miners' walkout. Stockpiles, which totaled more than 68.8 million tons on Mar. 1, were below the postwar peak but were considerably higher than for the corresponding date in any year since the war's end.

POWER—Energy produced by electric utilities during February, 1949, totaled approximately 23 billion kwhr, 3.6 per cent above the same month last year but 10.1 per cent below the 25.6 billion kwhr produced during January, 1949. As of Feb. 28, the total installed capacity of utility plants was 57,315,777 kw, an increase of 542,959 kw during the month.

BUSINESS — New business incorporations listed in February totaled 6362, representing the smallest number recorded since September, 1945, according to Dun & Bradstreet Inc. February's total was 19.5 per cent less than the 7906 for January and a drop of 19.2 per cent from 7873 charters in February, 1948.

CARLOADINGS—Estimates by the 13 regional shippers' advisory boards indicate that freight carloadings in the second quarter of this year will drop 3 per cent below the same 1948 period. These boards, which advise the Association of American Railroads, expect the principal decreases to be in agricultural products shipments with the largest decline expected in the Southwest.



Index (chart above): Week ended Apr. 2 (preliminary) 169 Previous Week 167 Month Ago 170 Year Ago 154

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	100.0	101.0	99.5	88.0
Electric Power Distributed (million kilowatt hours)	5,378	5,404	5,552	5,037
Bituminous Coal Production (daily av.—1000 tons)	395	478	1,802	361
Petroleum Production (daily av.—1000 bbl)	5,072	5,130	5,187	5,389
Construction Volume (ENR—Unit $1,000,000)	$132.2	$180.9	$118.6	$218.8
Automobile and Truck Output (Ward's—number units)	117,759	121,341	118,267	105,132

* Dates on request. † 1949 weekly capacity is 1,843,516 net tons. 1948 weekly capacity was 1,802,476 net tons.

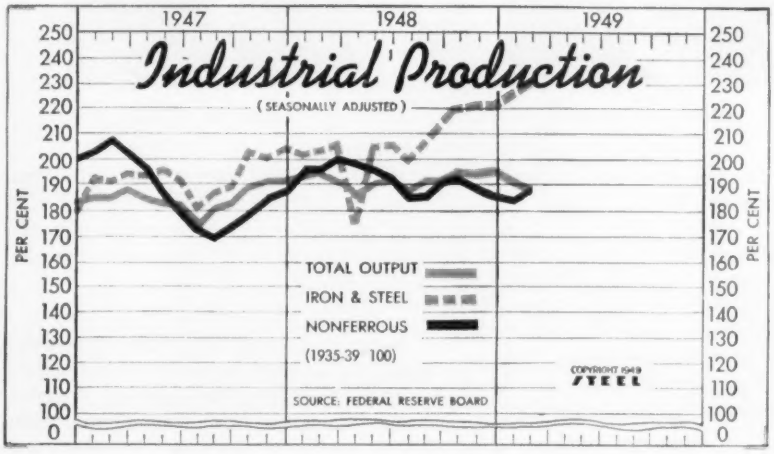
TRADE				
Freight Carloadings (unit—1000 cars)	706†	596	706	662
Business Failures (Dun & Bradstreet, number)	216	166	185	91
Money in Circulation (in millions of dollars)‡	$27,403	$27,423	$27,577	$27,780
Department Store Sales (changes from like wk. a yr. ago)‡	−16%	−16%	−7%	+17%

† Preliminary. ‡ Federal Reserve Board.

Factory Employment

(000 omitted)

	1949	1948	1947
January	15,880	16,267	15,372
February	15,747	16,183	15,475
March	.....	16,269	15,510
April	.....	15,950	15,429
May	.....	15,904	15,569
June	.....	16,115	15,672
July	.....	16,158	15,580
August	.....	16,441	15,962
September	.....	16,683	16,175
October	.....	16,576	16,209
November	.....	16,455	16,256
December	.....	16,284	16,354
Monthly Ave.	.....	16,274	15,794



Federal Reserve Board's Production Indexes

(1935-39=100)

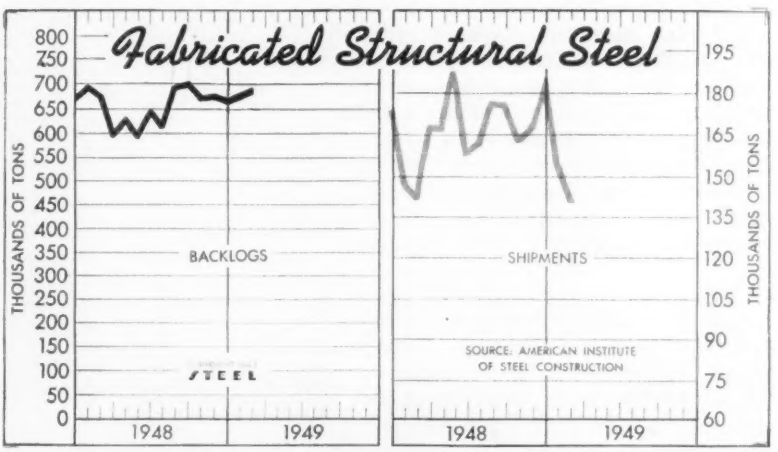
	Total Production		Iron, Steel		Nonferrous	
	1949	1948	1949	1948	1949	1948
Jan.	191	193	228	203	184	197
Feb.	189	194	231	203	188	197
Mar.	...	192	...	207	...	200
Apr.	...	188	...	177	...	198
May	...	191	...	206	...	197
June	...	192	...	207	...	193
July	...	186	...	200	...	185
Aug.	...	191	...	207	...	186
Sept.	...	191	...	214	...	191
Oct.	...	195	...	221	...	192
Nov.	...	195	...	223	...	187
Dec.	...	192	...	222	...	185
Ave.	...	192	...	208	...	193

Fabricated Structural Steel

(000 Tons)

	Shipments			Backlogs		
	1949	1948	1947	1949	1948	1947
Jan.	150.5*	146.4	140.6	675	692	661
Feb.	140.5	141.6	136.1	683	673	656
Mar.	....	167.0	137.8	...	597	614
Apr.	....	166.7	157.4	...	630	632
May	....	186.9	155.0	...	593	628
June	....	157.1	151.9	...	647	634
July	....	160.8	169.9	...	613	661
Aug.	....	176.3	158.0	...	691	639
Sept.	....	175.0	164.3	...	698	648
Oct.	....	164.0	196.1	...	669	649
Nov.	....	169.8	175.0	...	673	645
Dec.	....	182.4	173.0	...	670	671
Total	....	1,993.9	1,915.1			

* Revised.



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$12,600	$14,088	$13,763	$12,925
Federal Gross Debt (billions)	$251.7	$251.8	$252.1	$253.1
Bond Volume, NYSE (millions)	$16.6	$14.4	$14.3	$22.6
Stocks Sales, NYSE (thousands)	6,538	4,204	3,930	6,651
Loans and Investments (billions)†	$61.7	$62.4	$62.0	$63.2
United States Gov't. Obligations Held (millions)†	$32,680	$33,112	$32,814	$35,469

† Member banks, Federal Reserve System.

PRICES

STEEL's Composite Finished Steel Price Average	$96.68	$97.23	$97.77	$81.14
STEEL's Nonferrous Metal Composite‡	216.9	220.4	232.6	189.5
All Commodities†	158.1	158.2	158.8	160.8
Metals and Metal Products†	177.1	177.6	177.9	156.2

† Bureau of Labor Statistics Index, 1926=100. ‡ 1936-1939=100.

Men of Industry

THOMAS D. HUDSON

WARD DOUGHERTY

JOHN H. VOHR

Thomas D. Hudson, assistant purchasing agent. Cleveland and Pittsburgh districts, American Steel & Wire Co., Cleveland, United States Steel Corp. subsidiary, has been elected a vice president of National Association of Purchasing Agents. He will take office in June, succeeding **E. L. Clayton,** director of purchases for Philip Carey Co., Cincinnati.

—o—

W. A. Jones Foundry & Machine Co., Chicago, announces the following appointments: **Joseph A. Marland,** who has been handling sales in the Chicago territory, has been made sales manager, and **Thomas A. Jones** has been appointed assistant sales manager. **Joseph A. Guyer,** who has been handling general work in the sales and advertising departments, is now advertising manager.

—o—

C. S. Bygate has been appointed assistant vice president, Meter & Valve Divisions, Rockwell Mfg. Co., Pittsburgh. He started in the company's Pittsburgh Equitable Meter Division, and later transferred to general purchasing.

—o—

F. S. Cornell has been named assistant manager, Water Heater Division, A. O. Smith Corp., Milwaukee. For the past few years he has served as assistant to the president.

—o—

Richard J. Conroy has been appointed district manager of the Los Angeles branch office and warehouse, Whitman & Barnes Division of United Drill & Tool Corp., Detroit. He succeeds the late **E. L. Foreman,** and leaves the Chicago district where he served the company as sales and service engineer since 1944. He previously served the Independent Pneumatic Tool Co. in a similar capacity.

—o—

Ward Dougherty, export manager of the Machine Division, Osborn Mfg. Co., Cleveland, left for Europe Apr. 2 for a three month-business trip. He will visit France, Italy, Belgium, the Netherlands, England and Western Germany in behalf of Osborn's foundry machinery products.

—o—

Lew E. Wallace has been named general manager of sales, and **Jay W. Owings** assistant general manager of sales, Youngstown Sheet & Tube Co., Youngstown. Mr. Wallace succeeds the late **C. H. Longfield** in the sales department, and will have two assistants, Mr. Owings and **Myron H. Watkins,** who has been assistant general manager of sales for two years. Mr. Longfield's position as vice president has not as yet been filled. Mr. Wallace has been associated with the company for 34 years, and for 16 years has been manager of the New York sales office.

—o—

Harold Litchfield, assistant general sales manager, has been made a director and general supply sales manager of Graybar Electric Co. Inc., New York. He has completed 34 years of service with the company. **Willard Henges,** district manager at Cleveland, has been elected a director. The company announces that, in a reorganization of its sales department, **George F. Hessler,** vice president, will direct sales activities. Sales executives serving under Mr. Hessler's direction will be **C. S. Powell,** vice president, who will head up appliance and communication lines, and Mr. Litchfield, in charge of supply lines. The advertising and sales promotion department, headed by **K. P. Hopkins,** which previously reported to **A. H. Nicoll,** president, will now report to Mr. Hessler.

—o—

John F. Whalen has been appointed assistant sales manager, Merchandise Tools Division, Billings & Spencer Co., Hartford, Conn. Associated with the company for over 25 years, Mr. Whalen for the past several years has represented Billings in upper New York state and in Connecticut.

—o—

John H. Vohr, assistant general superintendent, South Chicago plant of Carnegie-Illinois Steel Corp., subsidiary of United States Steel Corp., has been promoted to the general superintendency of the company's Gary Steel works, succeeding **Stephen M. Jenks,** who has been promoted to Chicago district manager of operations. **Edwin H. Gott,** assistant general superintendent of the Gary plant since 1945, will be transferred to South Chicago to succeed Mr. Vohr.

—o—

Paul E. Lees has been appointed vice president in charge of sales, Standard Tool Co., Cleveland. He formerly was an executive of Weldon Tool Co., Cleveland, and currently serves as secretary of the Metal Cutting Tool Institute.

—o—

New officers elected by Redmond Co. Inc., Owosso, Mich., are: **James G. Kennedy,** promoted to vice president in charge of production; **Paul Maurer,** named vice president in charge of engineering; **Paul B. Best Jr.,** named vice president in charge of series motor sales; **James Tweedy,** new vice president in charge of in-

Is OVERHEATING your magnet problem?

The husky load of scrap in the photograph weighs practically the same as the first load lifted eight hours earlier. Why?

Ohio Magnets lift efficiently—*uniformly*—over extended periods of operation because they operate *cooler*. Copper coils are heavier-duty, carefully sealed with plenty of non-cracking asphaltum.

Uniform lifting capacity is one of the reasons why more mills are standardizing on Ohio. Satisfy yourself. Send your next order to Ohio—*25 years a leader in magnetic materials handling.*

This magnet lifts big loads all day long!

OHIO PROTECTO-WELD MAGNET is welded *on top*, where weld cannot be dented in. Sizes include 39, 46, 55 and 65-inch diameters. Ohio also builds magnet control equipment.

THE OHIO ELECTRIC MFG. CO. • 5900 MAURICE AVENUE • CLEVELAND 4, OHIO

ohio MAGNETS

A-2027

THOMAS F. O'BRIEN

L. B. McCARTHY

GEORGE D. COBAUGH

duction motor sales; **Wilfred R. Fox,** vice president in charge of advertising. **W. Walter Young** is now comptroller-treasurer, having previously held the position of comptroller.

—o—

MacDermid Inc., Waterbury, Conn., announces the purchase of the manufacturing and distribution rights of Troxide compounds from the Waverly Petroleum Products Co., Philadelphia, and the appointment of **Thomas F. O'Brien** to head a newly formed department which will develop and promote Troxide and allied acid salt compounds for metal finishing. He formerly headed the Industrial Chemical Division of Waverly.

—o—

W. E. Lynch has been appointed to succeed **F. W. Peters,** resigned, as district manager of the Transportation Division, central district, General Electric Co., Schenectady, N. Y.

—o—

W. R. Davies has been appointed audit supervisor, United States Steel Corp. of Delaware. He has been assistant to the audit supervisor.

—o—

B. Franklin Conner, executive vice president, has been elected president of Colt's Mfg. Co., Hartford, Conn., succeeding **Graham H. Anthony,** who becomes chairman of the board. **William T. Golden, David A. Goodkind** and **Sylvan C. Coleman** were elected to the board of directors. **Frederick E. Burnham,** controller and secretary, **Francis W. Cole,** chairman of the board of Travelers Insurance Co., and **Charles B. Cook,** former executive vice president of Royal Typewriter Co., have resigned as directors of Colt's. Mr. Burnham, however, will continue in his official capacities with the company.

—o—

Aviation Maintenance Corp., San Francisco, announces that **George E. Lam** has been added to its staff as general works manager, and **James W. Roche** is in charge of the Quality Control Division. Mr. Roche formerly headed both departments.

—o—

L. B. McCarthy, general superintendent, and a veteran of 45 years' service with General Fireproofing Co., Youngstown, manufacturer of metal office furniture and equipment, has been elected vice president in charge of operations. He is succeeded as general superintendent by **A. H. Anderson,** who has served as assistant general superintendent since 1946.

—o—

Paul J. Welsh has joined the research staff of E. F. Houghton & Co., Philadelphia. He was previously on the development staff of B. F. Goodrich Co., Akron.

—o—

M. R. Randlett, assistant divisional director of the Milwaukee Paint Division, Pittsburgh Plate Glass Co., Pittsburgh, has been elected divisional director, succeeding **Frederick L. Theurer,** retired.

—o—

Newly elected directors of Albion Industries Inc., Albion, Mich., are: **Walter R. Konkle,** chairman, **Ralph R. Brooks, Stephen E. Janus, R. Davis, A. A. Magnotta.** Mr. Brooks was elected president, Mr. Janus, vice president, Mr. Davis, treasurer, and Mr. Magnotta, secretary. Mr. Brooks as president succeeds **Paul H. Sleeper,** resigned as president and general manager of the company.

—o—

John D. Judge, executive vice president, Tube Reducing Corp., Stamford, Conn., has been elected a director of the corporation.

—o—

John A. Beynon has been elected president of Brown-Bevis Equipment Co., Los Angeles. He succeeds **Charles M. Weinberg,** who was named chairman of the board. **William H. Schutte,** formerly vice president of Western Pipe & Steel Co., was elected vice president to succeed Mr. Beynon.

—o—

George D. Cobaugh has been promoted to St. Louis district sales manager of Harbison-Walker Refractories Co., Pittsburgh, succeeding **Frank Weir,** recently named Pittsburgh district sales manager. Mr. Cobaugh joined the company in 1928, and for the past 10 years has been connected with the Birmingham sales district, with headquarters in New Orleans.

—o—

Joseph S. Tuite has been appointed superintendent of power at Midland Works, Crucible Steel Co. of America, Pittsburgh. He was formerly associated with Youngstown Sheet & Tube Co. in a similar capacity at its Indiana Harbor Works.

—o—

Wilbur S. Hinman Jr., deputy chief of the ordnance development laboratory, National Bureau of Standards, has been appointed assistant chief of the bureau's Electronics Division.

—o—

Gordon R. Graham has been appointed general auditor, National Supply Co., Pittsburgh. He has been associated with the company since 1945, serving as controller of the company's Spang-Chalfant Division plant at Etna, Pa. He succeeds **W. T. Windle,** who has accepted an executive position with Carborundum Co., Niagara Falls, N. Y. **Eugene F. Thayer** succeeds Mr. Graham at Etna.

—o—

James H. Rickey Jr. has been made production manager, and **W. Carl Elswick,** purchasing agent of Ironton Fire Brick Co., Ironton, O.

—o—

G. Marshall Drake has been appointed

ROBERT S. G. GRUVER

Appointed administrative assistant, Operating Division, Armco Steel Corp., Middletown, O. Noted in STEEL, Apr. 4 issue, p. 95

H. L. KENT

Appointed assistant to the president, Standard Railway Equipment Mfg. Co., New York office. Noted in STEEL, Apr. 4 issue, p. 95

JAMES M. DARBAKER

General manager of sales, Carnegie-Illinois Steel Corp., subsidiary, U. S. Steel Corp., Pittsburgh. Noted in STEEL, Apr. 4 issue, p. 95

sales manager, Plasteel Division, Lewis & McDowell Inc., New York, specialized construction and engineering firm, recently appointed district representative for plasteel roofing and siding products in the New York area for Plasteel Products Co., Washington, Pa.

—o—

Following the recent purchase of the Arthur Colton Co. of Detroit by Snyder Tool & Engineering Co., Detroit, officers of the Colton Co. have been announced as follows: **Clarence Snyder,** chairman of the board and vice president; **Howard N. Maynard,** president and treasurer; **K. B. Hollidge,** executive vice president and secretary; **Harvey W. Purdy,** assistant secretary; **Samuel D. Harrison,** assistant treasurer; **Alfred W. Kath,** director of engineering; **Nelson Carman,** director of sales.

—o—

Changes in the personnel of Pittsburgh Steamship Co., Cleveland, are: **Donald C. Potts,** elected vice president of operations, **R. C. Stanbrook,** vice president-engineering, and **Harold L. Hale,** made comptroller. Mr. Potts has been assistant to the president, Mr. Stanbrook, marine engineer, and Mr. Hale, assistant auditor of the company.

—o—

Walter L. Adams has been named sales manager, Sheridan Products Inc., Racine, Wis. He previously was general sales manager, Crosman Arms Co.

—o—

Earl W. Bennett has been elected chairman of the board of directors, and **Leland I. Doan,** president of Dow Chemical Co., Midland, Mich. The latter fills the position left vacant by the death of **Willard H. Dow.** The position of chairman had not previously been filled. Mr. Bennett had been vice president and treasurer, and also chairman of the finance committee. He will continue to hold the latter position. Mr. Doan had been vice president and secretary.

OBITUARIES . . .

Willard H. Dow, 52, president, Dow Chemical Co., Midland, Mich., was killed Mar. 31 when his private plane crashed and burned near London, Ont., enroute to Boston. Mr. Dow took over the presidency of the company at his father's death in 1930.

—o—

Arthur Purnell, 60, Chicago district sales manager, Youngstown Sheet & Tube Co., died Apr. 1 of a heart attack. He had been with the company for 42 years, and in the Chicago office for 20 years.

—o—

Anna L. Hugus, 56, co-ordinator of raw materials, Carnegie-Illinois Steel Corp., Pittsburgh, died Mar. 19. She was with the company 36 years.

—o—

Harrison W. Fitzgerald, 76, since 1948 associated with Armco International Corp., Chicago, as chief draftsman, working with plans for extensive construction in Argentina, died recently. He was associated for many years with a number of companies in engineering and the construction of plants in this country and abroad.

—o—

Robert H. McClurkin, 68, president, Matthiessen & Hegeler Zinc Co., La Salle, Ill., and Barnes Metal Products Co., Chicago, died Mar. 29.

—o—

Carl H. Will, 55, president, Tropic-Aire Inc., and Greyhound Motors & Supply Co., Chicago, died Mar. 26.

—o—

W. Bevan Dunsford, 44, president and treasurer, Lowell Insulated Wire Co., Lowell, Mass., died Apr. 3.

—o—

Frank H. Stohr, 47, general manager of the Norwood, O., Works, Allis-Chalmers Mfg. Co., died recently.

—o—

Irving L. Burrows, 62, former manager, Product Engineering Division, Behr-Manning Corp., Troy, N. Y., died Mar. 30.

—o—

William J. Kinsner, associated with the Oster Mfg. Co., Cleveland, since 1902, died Apr. 3. He was traffic manager at the time of his death.

—o—

Samuel Forestek, president, Forestek Plating & Mfg. Co., Cleveland, died Apr. 4.

—o—

Harold F. Hodgin, for the last seven years in the administrative branch, Cleveland Diesel Engine Division, General Motors Corp., died Apr. 4.

—o—

John H. Ford, 66, president, Union Iron Works Co., Washington, died Apr. 1.

—o—

Elmer A. Lundy, 55, president, E. A. Lundy & Co. Inc., New York, died recently.

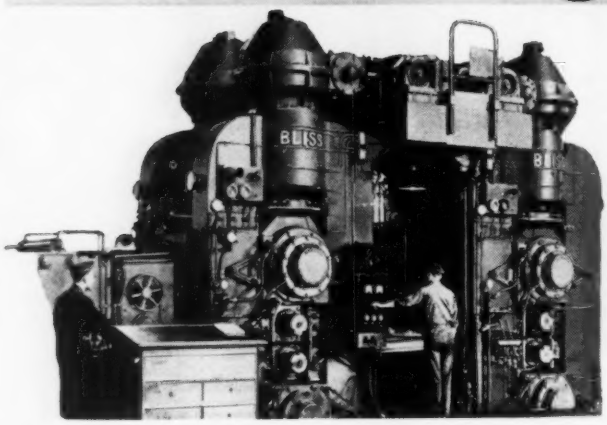
—o—

Jacob Nelson, president and treasurer, A. H. Nilson Machine Co., Bridgeport, Conn., died recently.

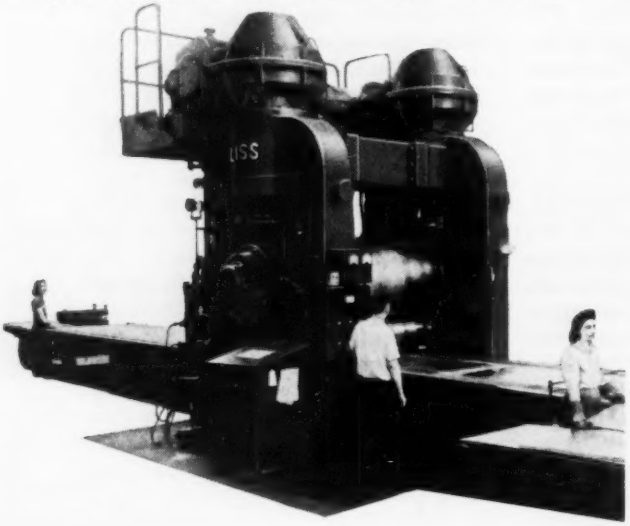
—o—

Zar T. Crittenden, 54, chief metallurgist, Pontiac Motor Division, General Motors Corp., Pontiac, Mich., died Mar. 25.

In Rolling Mills, too,



BRASS—16" x 34" x 34" two stand tandem four-high mill is one of many Bliss installations used for breaking down brass slabs.

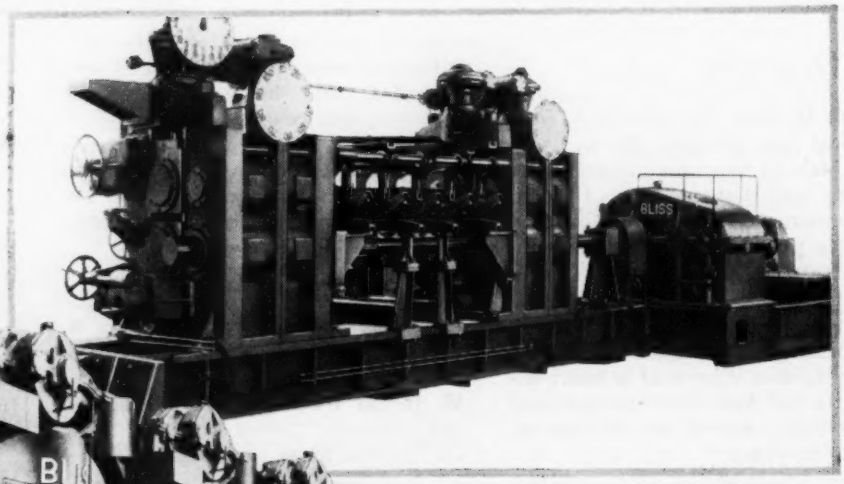


MAGNESIUM—16" x 33" x 72" single stand four-high mill is used to reduce thickness of magnesium sheets.

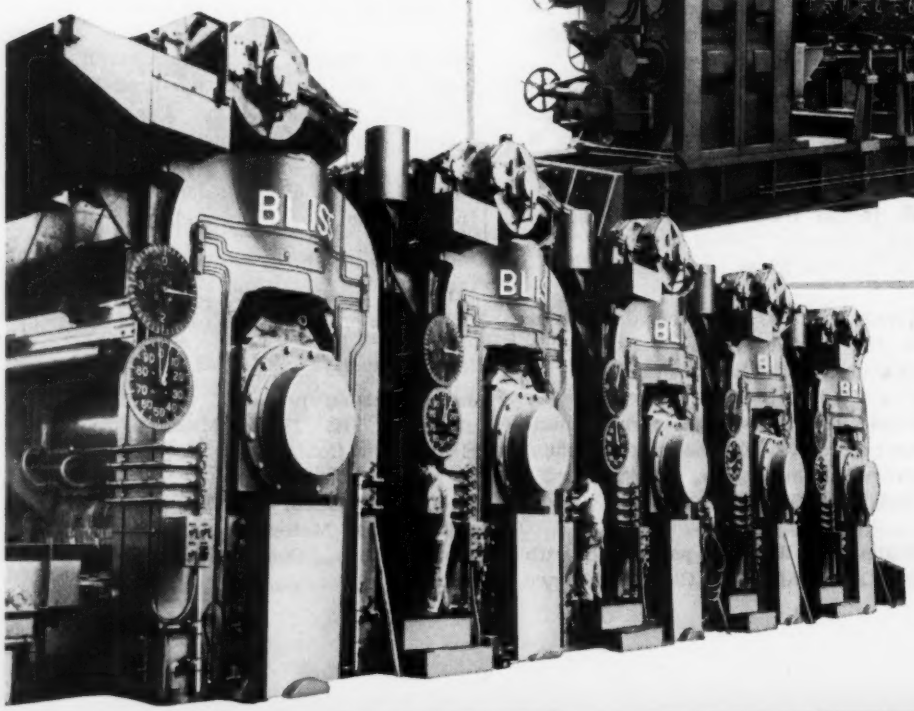
Hundreds of outstanding Bliss sheet and strip mill installations—here and abroad—give daily evidence of the close cooperation between customer and builder which alone can create a mill exactly suited to the job at hand.

Whether your requirements concern 2-, 3-, 4-high or cluster mills; hot or cold-rolling of ferrous or non-ferrous metals, Bliss can supply the equipment especially designed to suit *your* needs. Bliss also builds an extensive variety of accessories: mandrel type hot mill coilers, up-coilers, slitters, etc. Some of this equipment are illustrated on these pages.

Put your rolling mill problem up to Bliss. You'll find the same keen engineering counsel and service which have made Bliss the first name in presses for more than 90 years.



ALUMINUM—Heavy duty rotary trimmer and scrap cutter used by aluminum industry for trimming the sheet off the hot mill.



ALUMINUM—26" x 55" x 80" five stand continuous finishing train of a hot strip mill for aluminum.

Engineering News . . . AT A GLANCE

SEVEN-MINUTE DRYING— Freshly finished auto heater parts in the Eaton Mfg. Co. Cleveland plant are dried in two conveyorized infrared ovens in a matter of 7 minutes to keep assembly operations going at a brisk pace. Setup is one of the principal factors that enables the company to wrap and pack completed heaters in less than 1 hour after components leave the receiving area. Both ovens, a floor mounted unit and a ceiling installation, are located in the same area, and each is capable of handling 3 tons of steel per hour.

POWDERED ALUMINUM—In Louisville, Reynolds Metals Co. reports it is now supplying aluminum powder to concerns making a new type cold solder that requires no heat for application. Doughlike, and having the consistency of plastic wood, the solder is applied to metal areas to be mended by a spatula. Upon evaporation of the solvent the metal mass quickly hardens sufficiently for filing or sanding. Strong bonding properties enable the product to be used for building up thicknesses as much as 1 inch.

"TAILORED" PALLETS— Shipping crates and pallets now can be made with production-line efficiency and "tailored" to meet exact specifications by a new nailing machine developed by Food Machinery & Chemical Corp., Riverside, Calif. It is designed to drive as many as 24 nails—3 to 10-penny—in practically any nailing pattern. Operation of the machine is simple, requiring very little operator experience. Flexibility of the unit is such that is can be used for varied operations—making refrigerator cases, panels for prefabricated buildings, framing attachment for boxes etc.

EIGHT-HOUR WELDING JOB— To provide its valves with an internal surface of special alloys suitable for handling corrosives, abrasives etc., Nordstrom Valve Division, Rockwell Mfg. Co., Oakland, Calif., uses a setup that requires welding operators to work at individual furnaces—sometimes for 8-hour stretches. The valves, some of which require deposition of as much as 16 pounds of hard-surfacing rod, are processed by placing them in a gas-fired furnace, and heating them from a mild preheat to a very high temperature—depending on type of rod to be used. While held at this predetermined temperature, the operator applies the welding rod, controlling the rotation of the valve in the furnace at the same time. To keep things from getting too hot, both door and door opening of the furnace are water cooled as well as the torch used.

MINIMIZES GRAIN SPLITTING— Problem bothering metallurgists when brazing stainless steel parts is penetration of the brazing alloy into the grain of the pieces being joined. This tends to weaken the bond quite noticeably and is likened to splitting a piece of wood along its grain with an axe. This problem, according to the *Westinghouse Engineer,* appears to have a solution in the form of a new brazing alloy developed in Germany. Use of the alloy, consisting of 85 per cent silver and 15 per cent manganese, causes little intergranular penetration. Although the alloy itself is not quite as strong as the usual copper alloy, the overall joint produced is much stronger. The German contribution is still in the experimental stage, but it may open the way for increased use of austenitic stainless steels in parts subjected to high stresses, and also may provide an answer to brazing problems on high-temperature alloys.

ALL AROUND SAVINGS — Method adopted by Ford to produce hot-formed steel shapes offers several advantages, both economic and engineering-wise. Savings in steel, for example, amount to about 30 per cent. Billet weight for the old method averaged 7½ pounds per spindle while that for the extruded type is 5½ pounds. This represents a saving of approximately 10 tons of steel per day which otherwise would be discarded as scrap. (p. 82)

"PIN-POINT" HARDENING — Versatility and speed of a selective flame surface hardening technique developed by Cincinnati Milling Machine Co., Cincinnati, is attracting much attention in the metal treating field. It enables heat treaters to "pin-point" the flame to the exact portion or portions of the work to be hardened, controlling surface temperature so closely that uniform hardness is imparted to the part regardless of whether several or several hundred are processed. (p. 86)

PLENTY OF AIR — Air pressure plays a major role in the operation of a bessemer converter. It is supplied to an operating converter within a range of pressure from the minimum required to keep the molten contents from going back into the tuyeres and wind box, to the maximum that can be used without causing excessive ejection of material from the mouth of the unit. According to H. W. Graham of Jones & Laughlin Steel Corp., who traces the development of the bessemer converter from its early stages, the range for a 25-ton converter is roughly 20 to 30 pounds per square inch, and an average blast volume may amount to 35,000 cubic feet per minute. Steam or electrically-driven turbines are used to develop the range of pressures. (p. 90)

SPEEDS GAS WASHER CLEANING—Problem of cleaning blast furnace gas washers now is reduced to a small task by a chemical process developed by Dowell Inc., Cleveland. Development makes it possible to clean washers while in service in a matter of a few hours without reducing wind on the furnaces. (p. 101)

Hot Extrusion

APPLIED T

By CLAUD L. STEVENS
Supervisor
Quality Control Laboratories
Rouge Automotive
Manufacturing Operations
and
GUSTAV VENNERHOLM
Metallurgist
Ford Motor Co.
Detroit

Fig. 1 — Extruded part, using simple die

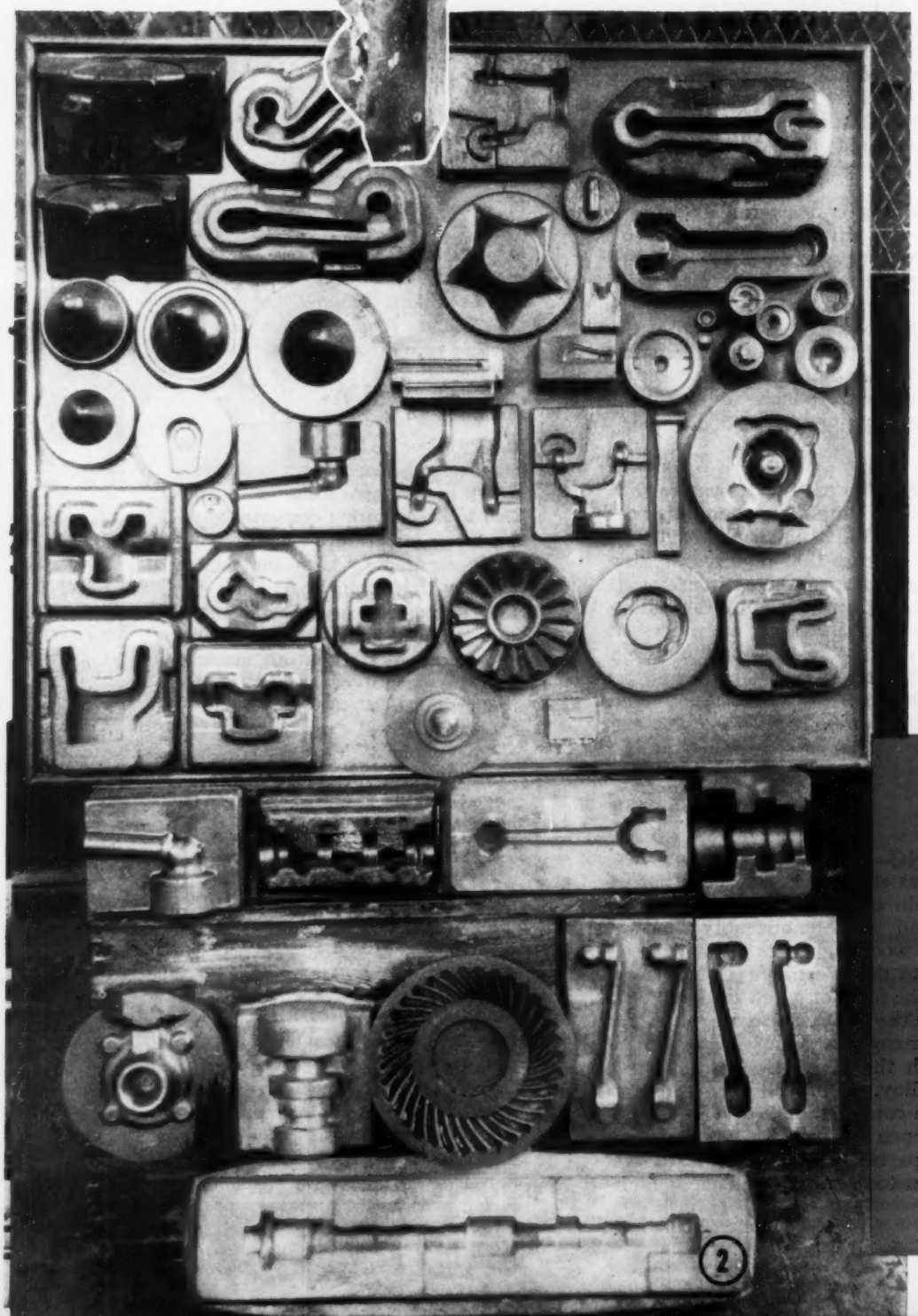


Fig. 2—Examples of typed dies

Fig. 3—Experimental split die used to demonstrate possibility of extruding such shapes as front wheel spindles

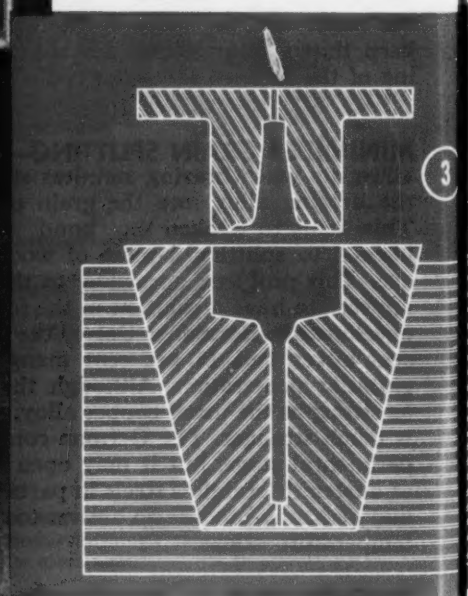


Fig. 4—Upset punch made by hot die typing

Methods

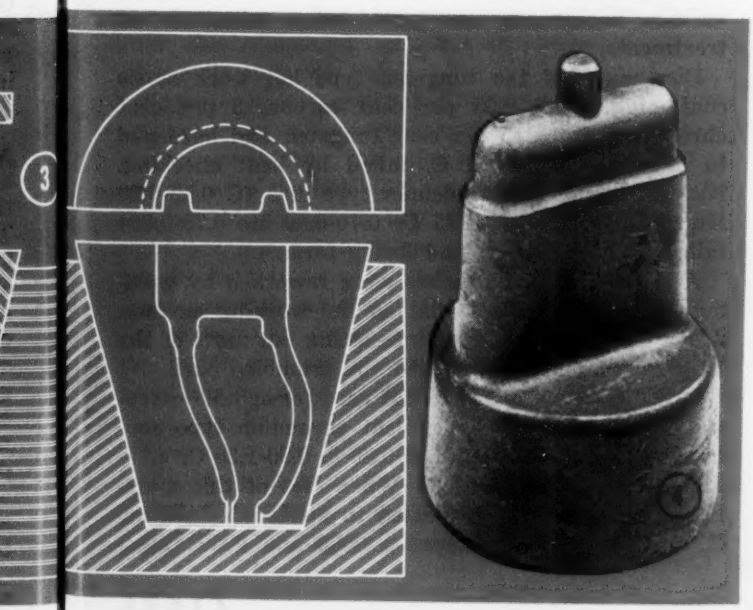
AUTOMOTIVE PARTS

Technique adopted by Ford to produce hot formed steel shapes enjoys both economic and engineering advantages including savings of 30 per cent in steel, 65 per cent labor, 80 per cent floor space, 40 per cent die costs, excellent fiber flow conditions

AS EARLY as 1928, experiments were conducted in Ford Motor Co., on precision hot forming dies and other tools by means of a combination of coining and extruding methods. This work originated as a result of difficulty experienced with a coining punch which, because of its shape, was being machined and assembled as inserts. The poor life of this tool made it desirable to make it in one piece, if possible.

This tool was made successfully by the hot forming method which later became known as hot die typing. The results were so encouraging that the method was used for other tools and it was finally developed for hot upset dies, hammer forging dies and the like, resulting in greatly increased economy both in the manufacture of tools and in tool life obtained. (Fig. 2, typed dies)

In making some of the upset punches by this method, Fig. 4, it became evident that when steel is heated to the proper temperature (about 2250°F) it can be extruded at much lower pressures than were generally thought possible. In 1932 valves were extruded from cast slugs and during this development a great deal of work was done on extruding die materials. Almost all the commonly used die steels were tried and it appeared at that time that the greatest number of valves could be made from 18-4-1 high speed steel dies produced by the die typing method and fully hardened.



Extrusion of valves was found to be entirely satisfactory. Nevertheless, this method was discontinued a year later in favor of casting because of the then new design which called for an enlarged diameter at the bottom of the stem, thereby eliminating the direct extrusion method.

In 1932 an effort was made to extrude the front wheel spindle. At this time, the design of the passenger car spindle included a steering arm on the right hand wheel and two steering arms on the left hand wheel. This appeared to present a complicated design for extrusion, in that the metal would have to be extruded in both directions. To demonstrate the possibility of extruding such shapes, an experimental die was made to half dimensions and extrusions produced in a 350-ton capacity press that had served as a trim press. Because of the shape, it was necessary to make a split die as shown in Fig. 3 so that the forging could be removed.

At the time, however, it was judged preferable to go ahead with the manufacturing of truck spindles. These also were of such design that they could not be made as a simple extrusion but because of the shape of the king pin lugs, required the split type die design. A pilot unit was set up, and approximately 2000 spindles were made by this method and were put into production.

Advantages—Advantages derived from this process were particularly evident in the increased fatigue life of the extruded spindle as compared with the forged spindle which, on a number of tests conducted, proved the extruded spindle of this particular design required many more cycles on a test fixture before failure than did the forging. Available facilities at that time, however, were badly needed for the rapidly expanding requirements for typed dies. Because of the very considerable savings in producing dies by this method, together with the increased productivity (which on some jobs was as high as 300 per cent), this method had come into persistent demand, and as a result the spindle extrusion was laid aside for the time.

Extrusion forging differs from conventional forging in that a punch and die are made in such a manner that the heated metal is confined so that it can only flow into the shape desired. Where the shape of a forging is such that it lends itself to forming by extrusion, considerable labor and material can be saved.

With the rapidly expanding conditions after the war, largely as the result of the abnormal postwar conditions, every effort, of necessity, had to be directed towards increased mechanization of tools and development of production increasing devices. Along with this, the interests in methods such as extrusion forging were strongly revived, in particular as the new designs lend themselves to extrusion in that they can be made in a simple die, Fig. 1.

A pilot unit was again set up to extrude passenger car front wheel spindles. The equipment available for this work consisted principally of a very early model crank type press, rated at 900 tons capacity at 30 strokes per minute, a gas-fired billet heating furnace, and a small trim press.

Die Design Studied—Die design was studied and a trial die was made to extrude the spindle upward into the moving member of the die; as in a number of extrusions this was thought to have some advantage over extruding into the lower or stationary die member. Further advantage was thought to be that with the spindle formed in this position, a larger area could be used for ejecting the forging from the die.

A number of forgings were extruded in this manner, and the metal was found to behave as expected. However, because the spindle end in this particular design is so near the edge of the flange, the punch used to form the spindle end had of necessity a thin wall on one side and failed before a satisfactory die life could be obtained. The die was then redesigned so that the spindle end and lower face of the pad were formed in the lower die section, where the side walls were well supported. The punch was used to form the king pin boss and upper face of the pad. The forging was ejected from the die by means of a mechanically operated knock-out pin. This arrangement proved to be satisfactory.

When the pilot unit was set up in running order, experiments were made to determine the most economical billet shape that would produce satisfactory extrusions. A rectangular shape had been suggested because it was thought that such a shape would more easily fill out the pad. Some of these billets were placed in the die so that the largest area was contacted by the punch. One objection to this was found to be that the press was loaded more abruptly than if the initial area of contact between the punch and billet were less. Some of the billets were then placed in the die on edge so as to lessen the initial contact area. This was beneficial so far as the rate of loading on contact, but presented a problem of properly locating the billet in the die. The same problem of locating preformed spherically-shaped billets was encountered.

Cold-Sheared Billets—After a number of shapes were tried, it was agreed that billets cold sheared from round bar stock 2½ inches in diameter and to the correct length are the most satisfactory shape, Fig. 6.

Two main reasons are given for this: First, the diameter and length of the stock make it self-locating in the die; second, when the press operates, the punch first contacts a very small area of the billet so that much less inertia need be overcome to get the metal in motion. Greatest load is encountered when the pad is squeezed to thickness. This, however, is at the end of the down motion and when the crankshaft of the press is in the position to deliver the maximum pressure.

Scale encountered during heating of the billets caused some difficulty because it tended to pack into the corners of the die and to adhere to the face of the punch; abrasive action of the scale tended to wear the die surfaces and to shorten die life greatly. Careful firing of the furnace and removal of the billets as they came up to heat so that they were not allowed to soak too long, together with the use of special protective atmosphere helped to minimize this condition. However, it was decided that a more foolproof type of billet heating was desirable.

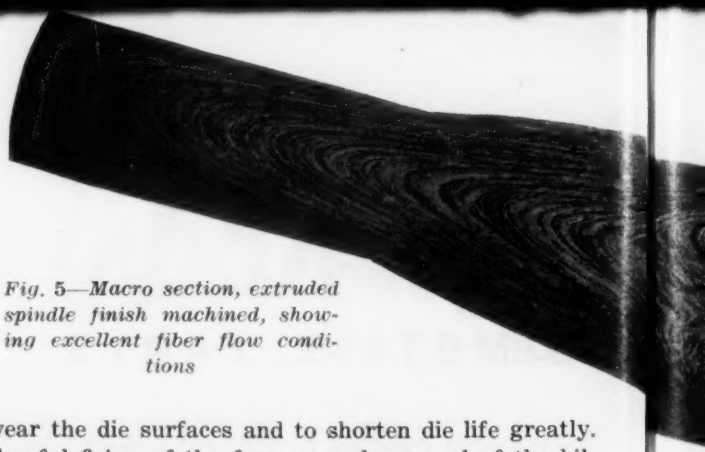


Fig. 5—Macro section, extruded spindle finish machined, showing excellent fiber flow conditions

High Temperature Salt Bath—A small high temperature salt bath was found to be available and this was set up near the pilot unit and billets were heated to forging temperature in salt. This provided a means of scale-free heating, but the surplus salt that was carried out on the billet had to be removed to prevent its building up in the die. This was removed by passing the heated billet quickly through a water spray. Billets heated in a salt bath furnace produced satisfactory extrusions; however, since the furnace was a small experimental type, the heating was much too slow to utilize the capacity of the press.

A continuous type induction billet heater was then set up which has capacity to clean heat three billets per minute. This is less than half the estimated capacity of the press when manually operated, but was considered satisfactory for experimental pilot operation.

More than 300,000 extruded spindles were made on this pilot unit; it has been kept in operation while a permanent installation was made in the forge plant.

Since it appeared that low productive die life would be one of the principal concerns, considerable attention was given to die materials and other factors affecting die life. Several new die materials had come into popular use since the first hot steel extrusions were made and many of these materials were tried at various hardnesses, and with many variations of treatments.

Dies made of the tungsten type hot work steels containing about 0.35 per cent carbon, 3 per cent chromium, 11 to 15 per cent tungsten and hardened to about 50 Rockwell C, failed by heat checking. Nickel-chromium molybdenum type dies (C 0.55-0.60 Mn 0.45-0.60 Ni 1.50-1.75 Cr 0.70-0.80 Mo 0.75-0.80) failed by washing out and losing form.

A number of the punches were reworked by welding a hard facing material on the working surface. A few of these runs were interesting but most of the hard facing material checked and crumbled out.

Most successful die material used for spindle extrusions to date is the 5 per cent chromium type containing: C 0.30-0.35 Mn 0.25-0.60 Si 0.80-1.20 Cr 4.75-5.50 W 1.0-1.5 Mo 1.4-1.8. When dies of this material are properly heat treated to about 50 Rockwell C, they will produce between 6000 and 9000 extru-

Fig. 6 — Billets cold sheared from round bar stock are the most satisfactory shape because the punch first contacts a very small area of the billet so that much less inertia needs to be overcome

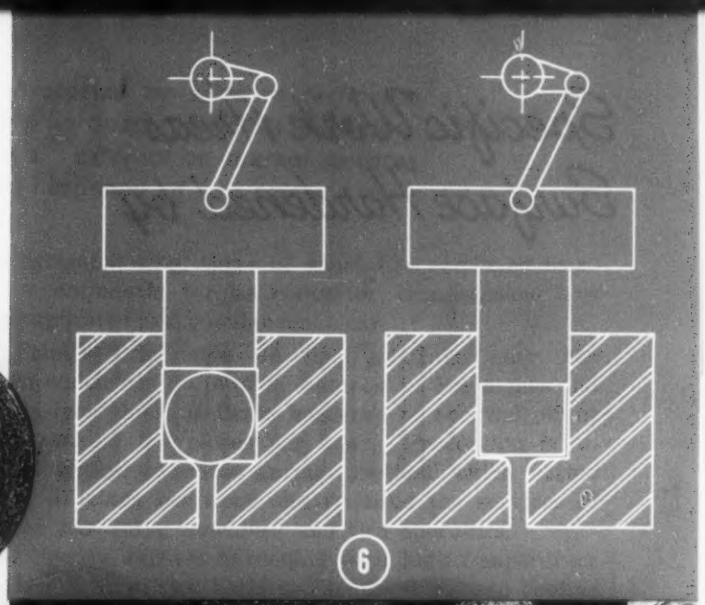


Fig. 7—Oil graphite die lubricant is frequently applied to dies

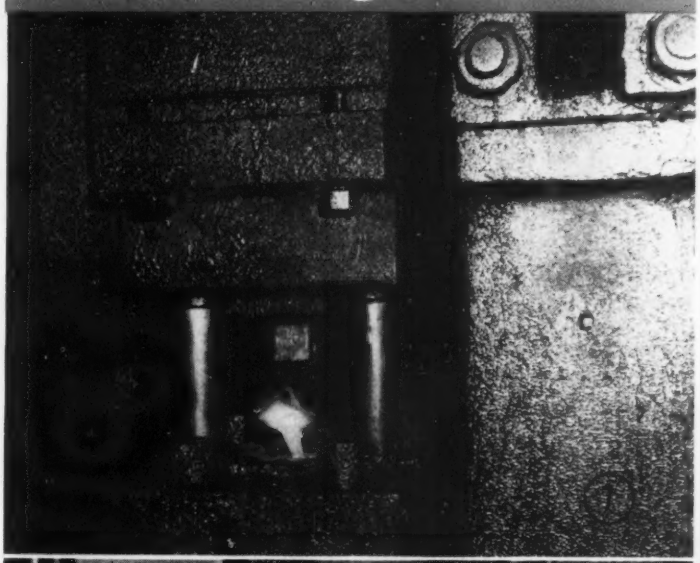


Fig. 8—Spray of air and water directed on punch and die cools and blows away any scale or foreign substance

sions in a press running at 30 strokes per minute.

Die Cooling—At this speed, the die and punch are in contact with the heated metal long enough so that a substantial amount of heat is transferred to the die members with each forging produced. However, in the pilot unit operation, the limited heating capacity (three per minute) permitted enough time between extrusions so that the excess heat was conducted from the dies rapidly enough to prevent their overheating and it was not considered necessary to provide a special means for die cooling. However, an oil graphite die lubricant is frequently applied to the dies, and it has been suggested that the residue from this compound furnishes an insulating coating on the die surfaces, Fig. 7.

Experience is somewhat different when extrusions are made on a modern forging press operating at higher speed than the pilot unit press; dies are in contact with the hot billet for a shorter time, but the number of extrusions that can be produced (about eight per minute) does not permit enough idle time for the heat to be conducted away from the die surfaces and it is necessary to use some special means for cooling. A spray of air and water directed on the punch and die serves to cool and also to blow away any scale or foreign substance that collects on them, Fig. 8.

Heating of the billet to be extruded must be controlled so that a uniform temperature can be maintained. In general, the optimum temperature for extruding is the temperature (*Please turn to Page* 110)

Specific Work Areas Surface Hardened by

Concentrated Flame Method

By JAY DeEULIS
Engineering Editor, STEEL

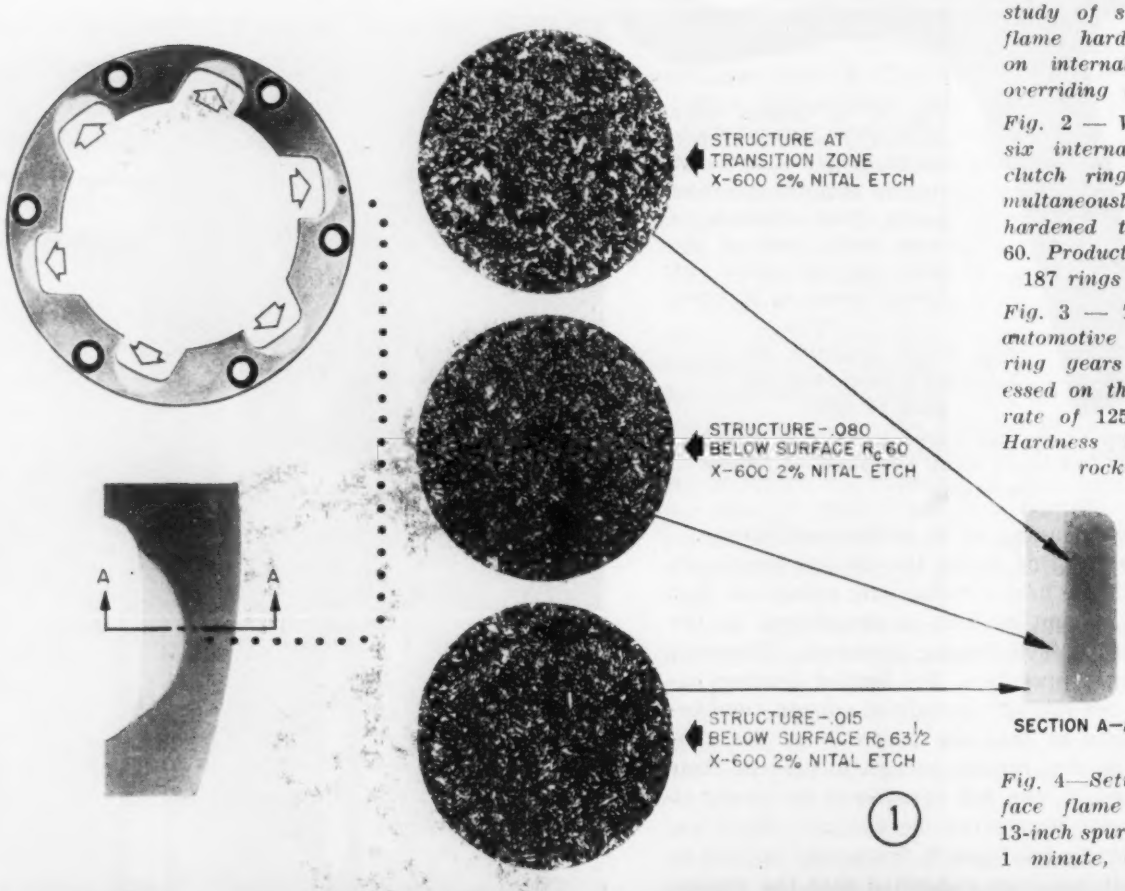

STRUCTURE AT TRANSITION ZONE X-600 2% NITAL ETCH
STRUCTURE - .080 BELOW SURFACE R_c 60 X-600 2% NITAL ETCH
STRUCTURE - .015 BELOW SURFACE R_c 63½ X-600 2% NITAL ETCH
A
A
SECTION A—A
1

Fig. 1 — Metallurgical study of selective flame hardened areas on internal lobes of overriding clutch cam

Fig. 2 — View shows six internal lobes of clutch ring being simultaneously surface hardened to rockwell 60. Production rate is 187 rings per hour

Fig. 3 — Twelve-inch automotive flywheel ring gears are processed on this setup at rate of 125 per hour. Hardness 55 to 60 rockwell

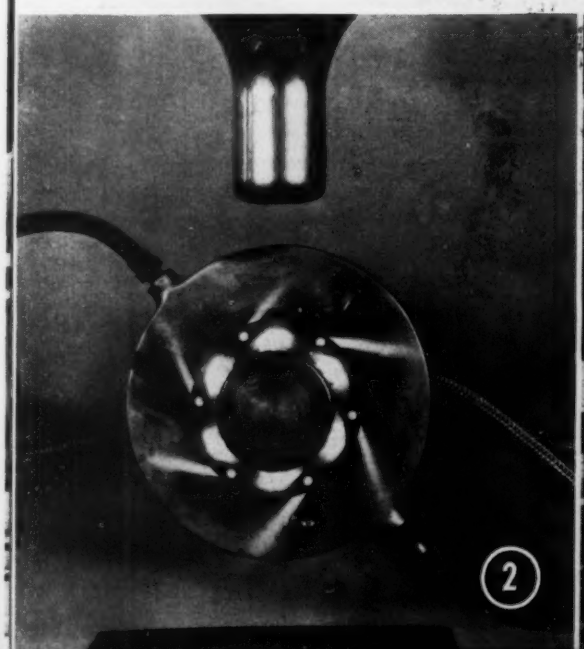


Fig. 4—Setup for surface flame hardening 13-inch spur gear. Time 1 minute, 40 seconds

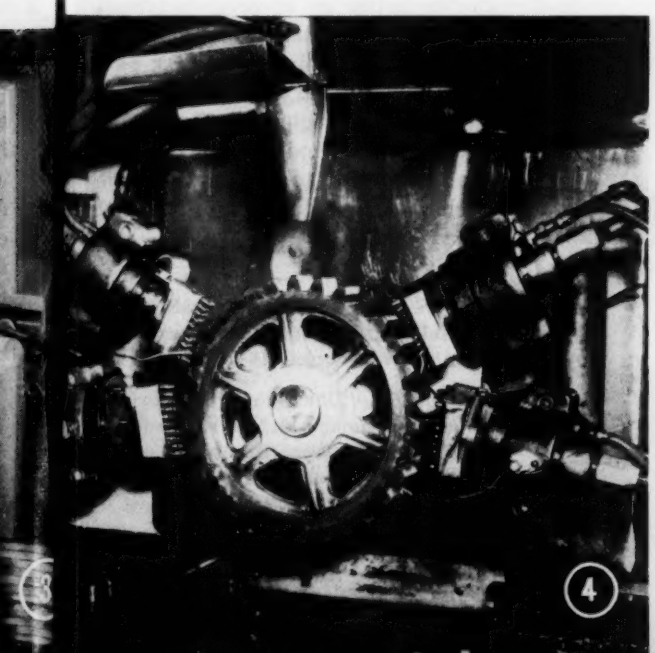
Difficult heating problems are speedily overcome by selective technique that enables heat treaters to achieve uniform hardness regardless of whether one or several hundred parts are processed. External or internal surfaces as well as multiple diameters are hardened at fast rates

SINCE its inception early in the recent war, the selective surface hardening technique developed in the heat treating department of Cincinnati Milling Machine Co., Cincinnati, has emerged as a full-scale industrial tool—one that is currently being used by other companies to quickly overcome many difficult production heating problems.

Like the flame thrower employed by the armed forces to pinpoint the "heat" in one spot, and almost as spectacular in action, the development is enabling heat treaters to selectively "pin-point" the flame to the exact portion or portions of the work to be hardened. Furthermore, it controls surface temperature so closely—within plus or minus 5° F—that uniform hardness is achieved in the heated part regardless of whether several or several hundred are processed. Versatility and speed of the method are such that it can be used to harden external or internal surfaces as well as work involving multiple diameters at high production rates.

Users Extend "Rating"—Originally, the Flamatic method, as it is called, was "rated" to handle gears, cams and similar parts up to 8 inches outside diameter with relatively small thickness, and shafts up to 18 inches long with correspondingly small diameters. For the past several years, however, users have extended the original rating. One heat treater, for example, used the method to harden a spur gear having an outside diameter of 19 inches and 2½-inch face. Another hardened in production quantities selective areas of worm shafts up to 30 inches in length and outside diameters up to 2½ inches.

One of the most recent applications of the process is found in the plant of an automotive manufacturer. Here, it is used to selective harden simultaneously discontinuous surfaces—ordinarily a difficult job. Surfaces hardened are the six internal lobes of an overriding clutch ring, three of which are employed in a new automatic torque converter transmission now incorporated in a popular make car.



Triples Production—In this particular case, the cam which has an outside diameter of 3⅝ inches and is ½-inch thick, is flame hardened to rockwell 60 at the rate of 187 pieces per hour. Production is almost tripled over the former method which netted only 67 rings per hour and required the services of three hardening machines and two operators.

Selective surface hardening with high temperature flame involves two basic problems. One is to confine the heat to the portion of the work to be hardened. The other is to control within narrow limits the exact temperature to which that area is heated. To maintain the desired hardness pattern in the metal, the heating cycle must be rapid—usually a matter of seconds. Thus, the need of exact temperature control is unusually critical.

In the above application, only 9 seconds are required to permit the heat to be rapidly conducted through the wall section to the peripheral surface of each clutch ring. The operation produces negligible distortion, no corrective measures are required to bring the geometry of the part back to required tolerances. The temperature responsible for the consistently uniform results hour after hour is provided by an electronic control.

In heat treating, the one element which must not vary is surface temperature. In this case, the hardening temperature is controlled accurately by a sensitive thermopile focused on the area of the ring to be treated. The heat pattern provided can be seen in Fig. 1. The heating cycle here is both accurate and instantaneous. It can be so rapid that the surface temperature may be raised as much as 500° F in 1 second.

No Rotating Action—As shown in Fig. 2, the work piece in this operation is not rotated according to the usual practice when flame hardening external surfaces. The clutch ring is mounted on a combination spindle and flame head. Six series of gas ports in the brass burner serve to impinge the flame on the six internal lobes. To prevent wear, as parts are slid on and off, metal inserts are used. Both the burner and stripper are water cooled. Except for manual loading, the operation is automatic.

To illustrate the flexibility of the process, O. C. Muehlmeyer Heat Treating Co., Rockford, Ill., is using the method to flame harden 36-tooth spur gears that have a 6¼-inch outside diameter and ⅞-inch face. The gears are heat treated at the rate of 800 per 8-hour day—about 22 seconds per unit. Here again, the production rate is almost tripled over the previous method.

In the plant of Accurate Steel Treating Co., Chicago, only 40 seconds are required to flame harden the worm on a 27½-inch shaft. According to the

company, use of the Flamatic unit reduced costs about 25 per cent. Furthermore, it eliminated two steps required to obtain the same results formerly—that of returning the part to the customer after carburizing, for machining case off ends, and through hardening and drawing the ends upon its return.

Distortion Minimized—Besides some of the advantages cited above, Perfection Tool and Metal Heat Treating, Chicago, finds the mild oil quench system used in connection with the Cincinnati method a big factor of importance in reducing distortion and eliminating cracking in the work. Also, the fact various setups can be arranged quickly—a matter of only positioning the flame head and electronic control assembly—enables the concern to process some 50 different parts.

In one instance, for example, the company flame hardened a 13-inch spur gear with a 2-inch face in a matter of 1 minute and 40 seconds. Setup time for arrangement shown in Fig. 4, amounted roughly to about 1 hour. Core properties of the work were unchanged and distortion so negligible that no corrective operations were required.

Exceptional combination of surface hardness with core toughness are provided in the fly wheel ring gear, Fig. 3, flame hardened to rockwell 60 in the plant of Automotive Gear Works Inc., Richmond, Ind. Typical gears flame hardened by the process are of SAE 1050 forging bar quality, fine grain steel in diameters ranging up to 16 inches, and ½-inch face. On this critical job, flatness of the ring gears is held consistently within 0.005-inch and roundness within 0.003-inch.

More than 40 parts utilized in the heavy equipment produced by Unit Crane & Shovel Co., Milwaukee, are selctively flame hardened by the Flamatic technique. Some of these are up to 16 inches diameter and are in the form of cluster gears weighing 60 pounds. The small end of a cluster gear is hardened by the company in 4 minutes while the larger is processed in 6 minutes.

Processes Multiply Diameters—Setup used by the Rockford Clutch Division, Borg-Warner Corp., to selectively surface harden simultaneously the spline and pilot end of primary takeoff drive shafts for truck and diesel engine gear reduction units is shown in Fig. 6. The shaft, 9 1/16-inch long and 1½-inches diameter, is of SAE 4140 steel, and is processed on the illustrated setup at the rate of 200 per hour—heating time being about 12 seconds per unit. The multiple diameters are hardened to rockwell 48-52, to provide the internal metal pattern shown in Fig. 5. Distortion in this case also is negligible, and the flame hardened surfaces require no subsequent machining. Other shafts of different diameters and length are handled in the setup by merely rearranging the flame heads and their tips to form any desired hardness pattern, plugs being used to stop up the holes not required. Fig. 6 also shows how the individual flame tips are positioned to concentrate the desired volume of heat in the right areas.

SHAFT LENGTH – 9 1/16
PART HARDENED – SPLINE AND END BEARING
HARDENED AREA DIAMETERS 51/64 AND 1 1/2
MATERIAL – 4140
STRUCTURE AT CORNER OF SPLINE Rc 59½ X-600 2% NITAL ETCH
STRUCTURE AT TRANSITION ZONE X-600 2% NITAL ETCH
BASE STRUCTURE X-600 2% NITAL ETCH
5

Fig. 5—Metallurgical study of multiple diameters hardened to rockwell 48-52

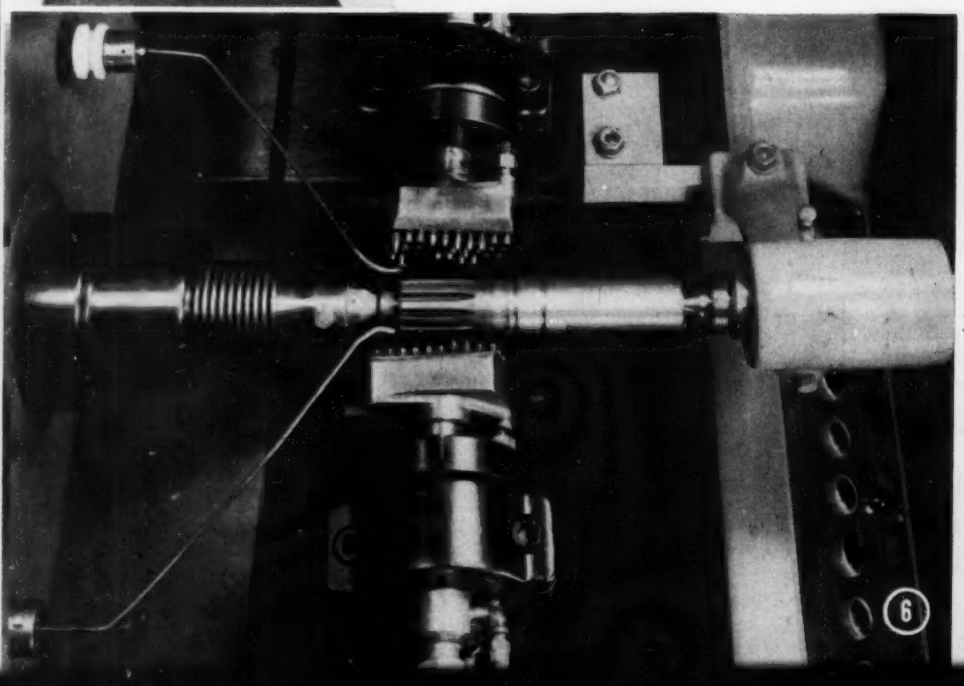


Fig. 6 — Down-view of work holding device and flame head. Note how flame tips are positioned in standard head to concentrate heat on two diameters of work

SEEN AND HEARD IN THE Machinery Field

By GUY HUBBARD
Machine Tool Editor

SERVICING MACHINE TOOLS: Throughout all the years during which I have been familiar with problems faced by the American machine tool industry, I have been impressed by the extreme lengths to which members of that industry have gone in "servicing" their machines. There properly is a limit to that kind of thing. I am inclined to think that they have gone the limit—and then some.

The owner of a 1918 model automobile certainly would no longer expect "free service" from the original manufacturer of that vehicle. He would consider himself lucky even to be able to purchase repair parts. However, I know of plenty of cases where owners of 1918 and much earlier vintage machine tools have within very recent years registered loud complaints because nominal charges have been made for time and traveling expenses of service men called in from the factory of the builder to diagnose ailments due either to old age or abuse of these vintage machines.

Machine tool builders are thoroughly justified in tightening up on this kind of thing—especially in view of widespread redistribution throughout industry of war surplus equipment which was "given the works" during the war and which in many cases has not received very considerate treatment since those hectic days. Owners of such equipment should feel fortunate indeed that interchangeable repair parts are available from the original builders at prices which in comparison to those charged for other types of machinery parts are extremely reasonable.

They have no more reason to expect "free service" from those builders than they would from the builders of motor trucks purchased out of government surplus —or from any other secondary source for that matter.

TOO BIG FOR THE DOOR: Builders of big machine tools constantly are up against the classic problem of the man who builds a boat in his basement: "How can we get it out through the door?"

In the case of the machine tool builder, this problem not only involves the door of his own plant and the door of his customer's plant, but also all the tunnels, bridges and other transportation bottlenecks between his plant and the customer's plant. Furthermore, it involves the capacity of his foundry to pour the big castings and the clearances of all the equipment used to machine them.

Sometime ago while visiting the plant of Consolidated Machine Tool Corp., Rochester, N. Y., I was shown a huge planer-type milling machine which obviously was too big to go through their door or anyone else's door. However, they were well aware of that fact and in the design of the machine had provided beautifully fitted dowled joints in the bed, table and other major members which permitted "disjointing" of this machine for shipment.

The amount of study which had gone into the railway and machine tool clearances, the size of plant doorways and passageways, the capacity of handling equipment, and ways and means for staying within these limitations, might surprise builders of ordinary "skid, crate and sling" size machine tools. So also would the amount of ingenuity and skill devoted designs for disjointing and exact rejoining of bed and table members.

All these things represent just a few of the many reasons why big machine tool building is "an industry within an industry". Only a few companies have the plants, the equipment and the "know-how" to handle this kind of business. Through consolidations, the number of such companies tend to become fewer. They are among our most valuable national assets. They must be preserved.

EXPERTS AT DISTRIBUTION: I am writing this on the eve of my departure for Savannah, Georgia, to attend the 25th spring meeting of the American Machine Tool Distributors' Association. This organization, made up of important companies whose business it is to sell what many of the important machine tool builders manufacture—and in various other ways to act as go-betweens from builders to users—is one of growing influence in the American industrial system.

Entrepreneurs of this kind have existed almost as long as the machine tool industry has existed. Some of the early ones became extremely powerful because of the inside track which they held in certain fields such as the railway industry. Failure to recognize the growing importance of newer fields of activity—the automobile business in particular—lead to the decline and eventual disappearance of several once famous machine tool selling companies.

Machine tool distributors today are far less inclined to have their eggs all in one basket. Neither do they depend, as they once did, on the personal influence of certain individuals with certain companies. As long as that sort of thing prevailed, the whole structure rested on a shaky foundation which could be swept away almost overnight by technological and personnel changes.

I know of no group of men today who are out in the front lines of American industry, who are any more alert to the ever-changing pattern of American industry and to the significance of the changes to those who design and build metalworking equipment, than are the members of AMTDA. I am confident that I will return from Savannah with the feeling that through association with these men I will have had the equivalent of a look into the future of the machine tool industry—not only its economic future but also its engineering future both in design and in tooling.

FUNDAMENTALS OF STEELMAKING

NUMBER **6** OF SERIES

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By H. W. GRAHAM
Vice President and Director of Technology
assisted by Robert E. Edwards and
Wayne G. Laughlin
Jones & Laughlin Steel Corp.
Pittsburgh

Production of Bessemer Steel

Since 1860 the size of bessemer converters has been increased, various mechanical control means have been proposed and tried, and efficiency of the process has been increased through a more thorough understanding of the thermochemical reactions which take place in the converter

Fig. 1—Bessemer convertor in operation

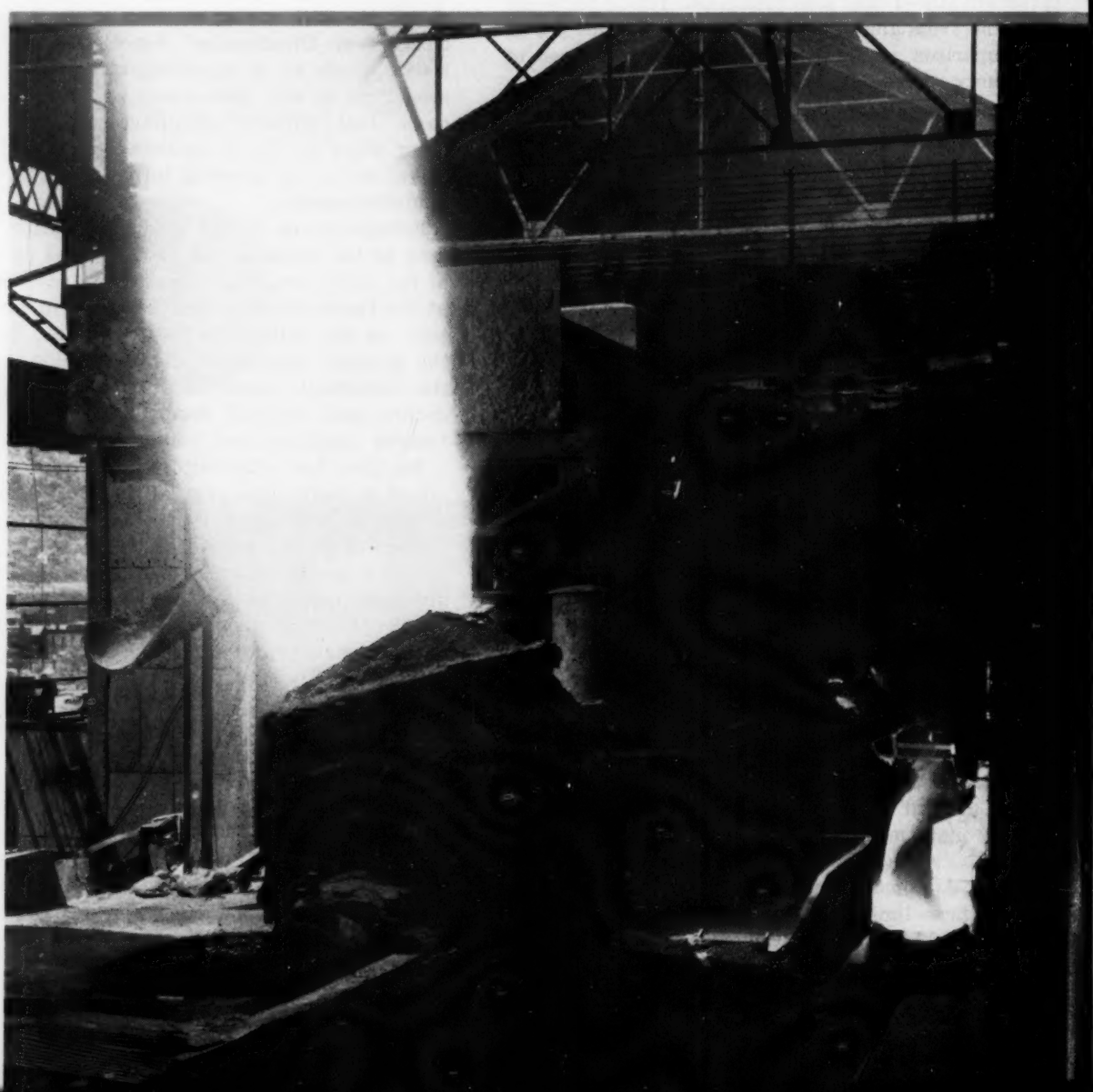


Fig. 2—Pouring molten iron into a hot metal mixer

CONVERTING molten pig iron to steel by blowing air through it was conceived in the minds of two men almost simultaneously. Working independently and separated by an ocean, Sir Henry Bessemer, an Englishman, and William Kelly, an American of Eddyville, Ky., concurrently developed the steelmaking method that today bears Bessemer's name. Bessemer patented a form of converter in England in December, 1855. Kelly's first patent was issued in 1857, but the United States patent office, in granting the patent, allowed Kelly's claim of priority. A third individual, M. Galy-Cazalet, a Frenchman, after hearing of Bessemer's experiments, claimed that he and not Bessemer was the true inventor of the process. Galy-Cazalet's patents did refer to a process of refining molten iron by passing steam through the bath, but none mentioned an air blast, the distinctive feature of the bessemer process.

Kelly originally regarded his discovery as a refinement of the puddling process and expected the charge to finish in a spongy mass as wrought iron. Bessemer probably realized the true significance of his invention, but in spite of the success of his early experiments, he encountered difficulty in getting the blows hot enough, and the steel also turned out to be decidedly red-short. Bessemer was compelled to granulate his product in water and remelt it in crucibles, which was economically impractical. These difficulties were finally overcome with aid from two sources. In 1856, Robert Mushet in England discovered the beneficial effect of manganese, through the use of spiegeleisen in the converter. About a year later, at Edske, Sweden, G. F. Goransson found that reducing the blast pressure and increasing the tuyere area made it less difficult to maintain a sufficiently high bath temperature.

The bessemer process was early put into successful operation in Sweden, largely because of the favorable character of native ores. Wherever the process was introduced an attempt was first made to use metal direct from a blast furnace, but practically everywhere but in Sweden this attempt was soon abandoned because of the fluctuation in composition of blast furnace iron. Cupolas were a necessary part of nearly every bessemer plant outside of Sweden until hot metal mixers were invented.

Sir Henry Bessemer's early experiments were so exhaustive that, although numerous modifications have been suggested and tried for special purposes, the tonnage production of bessemer steel is still carried on in a manner almost identical with that of the discoverer. Since 1860 the size of converter units has been increased, various mechanical control means have been proposed and tried, and efficiency of the process has been increased through a more thorough understanding of the thermochemical reactions which take place in the converter.

In the United States, Abram Hewitt erected an experimental converter in New Jersey about two months after Bessemer's announcement of his discovery. This was the first experimental bessemer converter in this country, as Kelly's converters, built as early as 1851, did not deliver the charge in a liquid condition, but as a spongy ball of iron. It was not until 1862, however, that attempts to manufacture on a commercial scale were made.

Bessemer Steel

A modern bessemer converter is a cylindrical, somewhat egg-shaped container with a closed, flat end, designated as the bottom and a tapered end with an opening called the nose. Overall size varies with the converter's capacity, expressed in terms of the tons of material charged or the tons of blown metal produced from the charge, with the latter used most commonly. A twenty-five (25) ton capacity converter has an effective inside bottom area of approximately 63 square feet with an inside diameter of about 9 feet. The outside diameter is about 3 feet greater, the difference being the thicknesses of the shell and lining. Converter design varies considerably from plant to plant depending on size heats produced, methods of charging and removing metal from the converter, blowing practices, plant layout, and many other operational differences.

The converter consists of three distinct sections. The body is a heavy steel shell composed of plates riveted together. The tapered upper end called the "nose" is usually a casting which is bolted to the upper end. Adjoining the converter body is the bottom proper which contains the tuyeres, a series of clay cylinders through which air is blown into the converter, a tuyere plate which forms the upper side of the wind box, which is a hollow space at the extreme bottom of the converter, that is connected to a blast pipe which provides the air supply.

The entire converter is keyed near the center to a cast trunnion ring which extends around its circumference and is supported by two heavy trunnion stands. One of the trunnions is hollow and is connected to the wind box at the bottom of the converter by means of a goose neck pipe, through which air blast is carried to the tuyeres and then into the converter proper. The other trunnion is attached to a large ring gear which in turn connects with a motor drive or hydraulic ratchet mechanism which revolves the converter.

Both body and nose of an acid converter are lined with large pieces of high silica stone, either of a variety called mica-schist or white sandstone. Converter areas which are subjected to the greatest erosion receive the closest attention with respect to both variety and thickness of material used at these points. Lining thickness may vary from approximately 12 to 24 inches, depending on the degree of erosion to which it will be subject in operation. After the lining is completed it is thoroughly dried by means of a oil, tar or gas flame. In practice it is often possible to patch or replace portions of the lining without completely removing the old lining. In some instances the lining is covered with a veneer coating at rather frequent intervals, thus eliminating, for extended intervals, the necessity for removing the old lining completely. When a converter requires relining, it is taken out of operation, the bottom de-

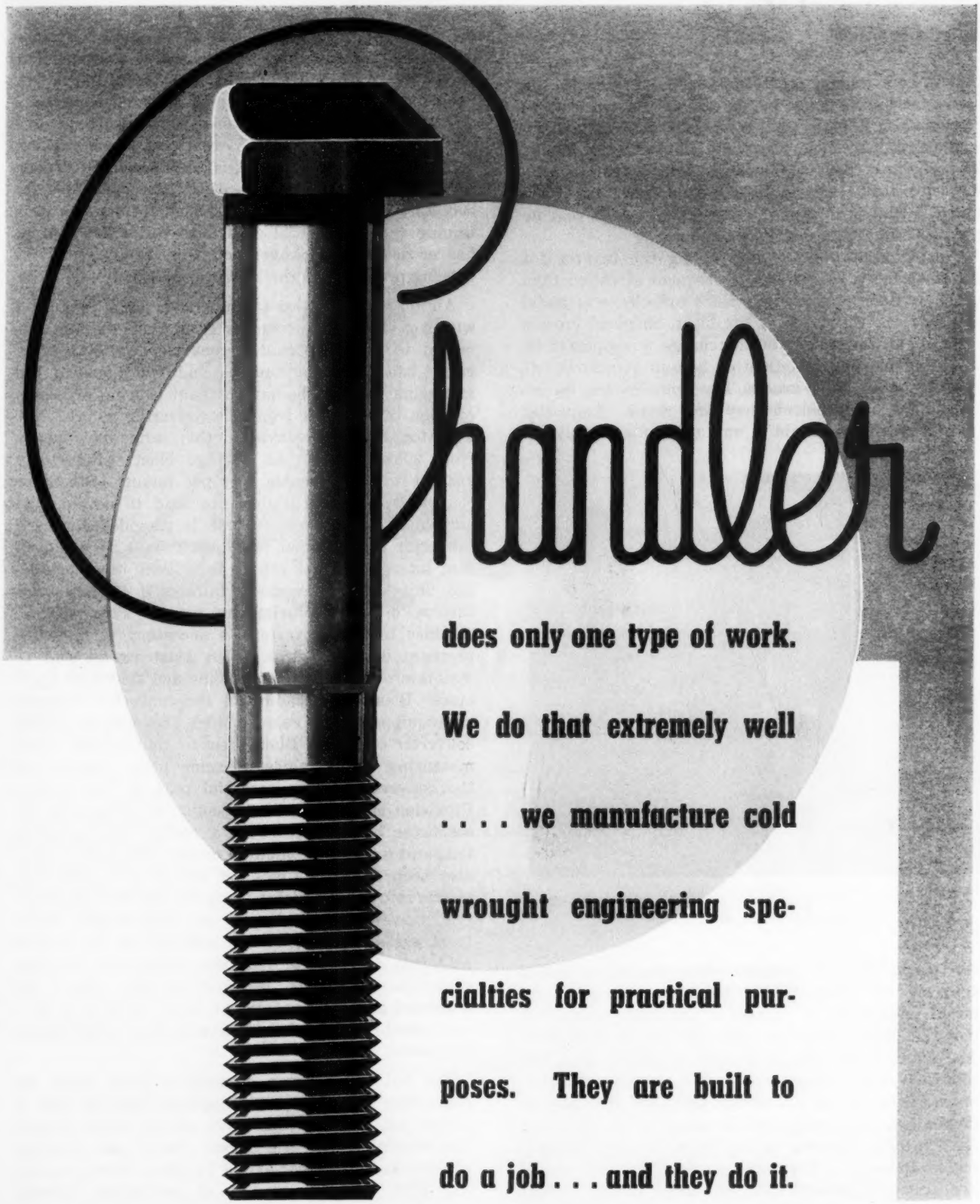
Fig. 3—Molten iron from blast furnace flowing into mixer type ("submarine") hot metal car

The author, Herbert W. Graham, graduated from Lehigh University in 1914 with the degree of electrometallurgist and has been employed by the Jones & Laughlin Steel Corp. continuously from 1914 to date in various supervisory positions of operating and technological character. He is currently in charge of all technical activities of the corporation as vice president and director of technology.

He was steel consultant to the Office of Production Management and War Production Board during World War II and chairman of the first steel group of the Nelson mission to China. He is a member of the Industrial Research Institute, American Institute of Mining & Metallurgical Engineers, American Iron & Steel Institute, British Iron & Steel Institute, Society of Automotive Engineers, American Society for Metals and the American Association for the Advancement of Science.

He was a co-founder and first full term president of the Industrial Research Institute, chairman of the Iron & Steel Division of AIME in 1943 and Howe Lecturer in 1947 and a member of the National Research Council's South American tour in 1941 (Industrial Research Institute).

His published books and articles include: "The Machinability of Free-Cutting Steels," "The Acid Bessemer Process of 1940," "Development of Rotary Drill Pipe," "Factors Which Determine Iron and Steel Making Processes," and many others.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tached and relining performed without moving the converter, or in many plants the entire unit can be relocated on a spare converter stand and replaced by a newly relined shell. Removal and replacement can be performed in a few hours and thus operational delays are comparatively brief. This spare converter stand is similar to a production stand, except that no provision for blast supply is required.

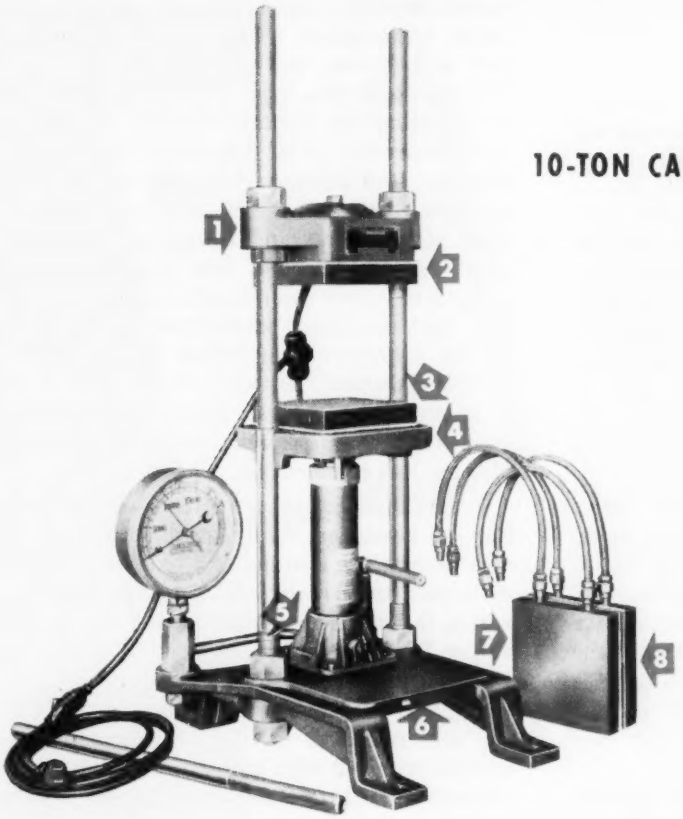
The converter bottom, containing the tuyeres for air blast entry, requires more frequent attention than other portions of the lining, since turbulence of metal results from the entry of the blast, chemical erosion occurs, and the weight of the charge is supported by it during blowing. Method of bottom attachment to the converter by T-headed key bolts makes its removal and replacement easy and rapid. Converter plants usually maintain a unit designated solely for

Fig. 4—Iron cupola furnace and two bessemer converters which it services

the preparation of bottoms, separated from actual converter operation. This bottom house contains sufficient equipment to furnish a necessary number of newly relined bottoms to insure continuous operation. The number and size of tuyeres contained in a bottom vary with converter size and operational differences; with 25 ton converters they are generally 36 inches long, 6½ inches in diameter, with either ten ½-inch holes or seven ⅝-inch holes running throughout their length. They are usually 35 in number and are arranged concentrically in circles in the bottom, permitting passage of air blast from the wind box into the converter. Tuyeres are supported by the tuyere plate and reinforced throughout their length by a mixture of tile brick and mortar composed of a highly siliceous ganister with a bonding clay, ground and with water added. The mixture can either be wet poured like concrete around the tuyeres or rammed into place in a plastic or semidry condition. The bottom is then placed in a gas fired oven and subjected to a temperature that will completely dry the mortar. This requires 24 to 48 hours. The bottom is then available for use as required. Bottom life varies considerably, but generally averages between 30 to 40 heats. During the life of a bottom, the wind box cover plate can be removed when necessary for inspection of tuyeres that have been prematurely destroyed. In the event that undue erosion of a tuyere has occurred, it is then possible to cover it, prohibiting any passage of air. In this fashion, successive tuyeres may be taken out of service, continuing with the useful ones until the entire bottom has eroded to the danger point, or insufficient blast is being provided for the blowing opertion.

Air blast is supplied to the converter in operation within a range of pressures from the minimum required to keep the molten converter contents from going back into the tuyeres and wind box to the maximum that can be used without causing excessive ejection of material from the converter mouth. For a 25-ton capacity converter this range is roughly from 20 to 30 psi. An average blast volume may amount to 35,000 cubic feet per minute. Steam or electrically driven turbines are used to develop the air blast. Ideally one turbine is provided for each converter in operation, with blast lines so arranged that interconnections can be made with other operating units in the event of failures or cessation of turbine operation during its repair. Proximity of turbines to the converters is necessary to minimize pressure drop and leakage in blast mains, and to maintain contact between turbine and converter operators. Blast lines leading to the converter trunnion are equipped with valves under the control of the converter operator. Blast pressure and volume gages measuring these values at some point adjacent to the converter are an essential part of the system. Provision is made for the injection of steam into the converter blast to serve as a coolant in regulating temperature of the molten metal. Provisions have also been made at times for injection of other materials into the converter using the air blast as a carrier, however, generally on an experimental basis. Inert gases to dilute the air and impede the rate of oxidation for control purposes, oxygen to increase oxidation rates and decrease blowing time, and powdered materials to serve various functions all have been used in special instances or for experimental purposes.

The hot metal mixer, a reservoir from which the converting mill draws its supply of iron, is used in almost all plants which have molten blast furnace iron available for use. Mixer design and capacity are dictated to a great extent by plant layout, operating rate, and the amount of production. Design varies from plant to plant. The mixer shell is made up of heavy steel plates riveted together. Provision is made for openings at either end, one to receive iron from the blast furnace iron ladle and the other to deliver iron to the converter charging ladle or spout. Some mixers are charged from the top rather than the end. The mixer is lined with siliceous stone, similar to that used in the converter itself, or with various types of refractory brick, and is supported by rockers or roller bearings in such a fashion that



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it can be tilted to deliver iron. The tilting mechanism is under close control so that iron can be weighed out accurately by scales on which the receiving ladle is placed. Capacity of mixers may vary from 200 to 300 tons, to larger units holding 1500 to 2000 tons. Since storage of iron for extended periods may be necessary with intermittent operations, provision may be made for heating by gas jets or other types of fuel. The term "active mixer" describes a type designed to perform some preliminary chemical treatment of blast furnace iron, such as the removal of silicon or sulphur. Arrangements are sometimes made to skim nonmetallic materials from the iron as it is poured into or from the mixer.

The use of relatively small capacity iron ladles for transportation of molten metal and the hot metal mixer has been replaced in one instance by mixer type iron ladles. These units, termed "submarine" or "torpedo" ladles because of their design, have sufficient capacity to contain and transport the major portion of a single cast of iron. Each ladle is equipped with a tilting mechanism which permits direct withdrawal of iron as required at the converting mill.

In small plants that do not have blast furnace facilities and are required to depend in whole or part on pig iron for their iron supply, provision for melting the converter charge is necessary. This operation is performed in a cupola, a unit designed specifically for this purpose, somewhat resembling a blast furnace. Solid materials are charged into the top of the cupola stack and subjected to the heat of burners and air blast injected at points near the bottom. The liquid flows down as melting proceeds and accumulates at the bottom, to be withdrawn as required. The cupola charge may be composed of both pig iron and selected types of scrap to produce the type metal most suitable for the blowing operation.

In larger converters particularly, huge quantities of steel scrap are used in the charge in addition to molten metal to compensate for normal variations in metal temperature. Other iron bearing materials such as pig iron, iron ore or scale are also used, but steel scrap is the most popular coolant. Provisions for handling this material include standard gage railroad tracks to a point convenient for unloading, crane capacity, and storage bins. The scrap addition may be made to the converter in several ways, depending upon plant layout and equipment available. In one plant, scrap is loaded into buggies containing approximately 3000 pounds and transported by elevator to a platform level several feet above and adjacent to the converter nose where the converter is in a vertical position. Movable chutes may be rotated to a position that permits scrap to be charged in any quantity desired directly into the converter after blowing has commenced.

Ferroalloys and other materials used in the production of bessemer ingots such as sulphur or copper also necessitate storage and handling facilities. Such materials are usually added to the ladle as the converter is emptied and are usually stored on the converter floor, a platform erected at the trunnion level which is required for many other purposes in servicing converters. Additions are frequently made to the ladle from this level, either manually or by means of bins provided with scales and chutes. In some cases materials such as ferromanganese are heated or melted in small furnaces specially designed for this purpose before the addition is made. Stone and mortar used in relining converters must be stored in quantity and available for use. The advantage of a spare relining converter stand separated from operating converter is evident in this respect.

Supplies of ganister mud, stone and other materials used in servicing converters without taking them out of operation are made available for use. The converter nose, and the juncture between the bottom and the converter, frequently require the application of these materials.

Disposal of refuse from the converter operation requires a systematic and extensive handling system. Slag resulting from the blowing operation presents the greatest problem, since its weight from an individual blow may amount to several thousand pounds.

Fig. 5—Train of ingot molds and stools used for the casting of bessemer steel ingots

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Bessemer Steel

Containing appreciable percentages of iron oxide and manganous oxide, this slag is often recharged into the blast furnace to recover the iron and manganese contained. In normal operations 3 to 5 per cent of the converter charge may be ejected from the mouth of the converter during blowing. This material is in the form of metal, slag and iron oxide. Since ejected refuse is high in iron content, a large portion may be recharged to the converter, thus recovering this loss to some extent.

Facilities for relining converter bottoms are generally kept separate from the converting mill proper. This unit includes unloading and storage facilities for the tuyeres, tile and mortar materials used in the construction of the bottom, crane capacity, grinding and mixing machines for the preparation of mortar, dig-out racks for removing and disposing of used bottom linings, drying ovens with fuel systems, stacks to carry off moisture, furnace temperature controls, and the bottom storage and transportation systems necessary to supply the converting mill with bottoms as operations require.

The converting mill plan determines the number and type of cranes that are used. Where mill layout requires the charging of converters by means of a crane, it is of utmost importance that a sufficient number (generally more than one per unit) of proper design are installed. Such cranes are subjected to the roughest treatment known in industry. Ruggedness, speed, and protection from heat and dirt are among their essential requirements. In addition to charging materials into the converters, they may also be required to change converters, lift replacement parts during major repairs to the driving machinery, transport patching materials and alloys, function in disposing of refuse in addition to numerous other duties. Cranes are generally of the overhead type supported by overhead crane railways, although plants that do not employ crane charging often use gantry type or jib type cranes to perform other lifting chores. Additional crane capacity may be required in the teeming operation if bessemer ingots are produced. This may be performed by supporting teeming ladles with overhead cranes or by the use of revolving cranes or screw type hoists.

All converting mills include a centrally located point in which as many as possible of the entire converting mill controls are centered. Mill operators are stationed at this point and smooth operation requires that all mill functions either be controlled directly by them or indirectly by signal systems. The operating pulpit is preferably located slightly above the converter charging level and in a place offering maximum visibility and comfort for personnel. From this point, the operator controls converter movement, air and steam blast, converter and ladle additions, operation of air blast turbines, iron mixers, safety signal systems, and all other operating functions that may be subjected conveniently to a central control. Operational records are also kept at this point.

Ladles suited to converter capacity are maintained in sufficient number to support operations. Converter charging ladle and ladles used in handling blown metal for duplex open hearth operations are lined with a suitable type of brick and equipped with a lip for pouring molten iron into the converter or blown metal into the open hearth furnace. Ladles for the teeming of bessemer ingots are equipped with a bottom nozzle to permit flow of metal as the ladle passes over each successive mold. Provisions for relining and drying ladles and making of stopper rods must be made.

Production of bessemer ingots requires a large supply of ingot molds and stools for continuous operation, with ingot buggies and a railroad system for transportation. Molds must be sufficient in number to permit their rotation through teeming, ingot stripping, cooling, cleaning, and mold coating operations. Type of product produced by the plant determines the type of molds required, however, many bessemer ingot plants produce a full variety of steel grades and use all or most of the popular mold sizes and types including bottle top, open top, big end up, big end down, hot tops, etc. Water spray systems for mold cooling sometimes are necessary to maintain mold rotation and avoid the use of excessively hot molds. Popular coatings for the interior walls of ingot molds before teeming include liquid tar, liquid or powdered pitch, graphite, salt, and many other materials designed to minimize the attachment of metal to the mold wall. These materials are applied by dipping the mold in the material or by spraying or brushing the coating onto the mold.

Platforms erected at the level of the top of the ingot molds provide working space for teeming crews and serve as a storage space for various materials used in the teeming operation. Mold caps and keys for bottle top molds, test molds and ladle test spoons, oxygen systems for use in burning scrap that may result from spills, materials for mold additions, such as aluminum, plates or caps for rimmed ingots, etc.

(To be continued)

Radio-Telephone Controls Plant Railroad System

Voice of WGDG, Granite City, Ill., belongs to Granite City Steel Co., and is used to control railroad movement within the plant area. Installation of this radio-telephone communications system is expected to save both time and money and provide a more efficient railroad service to every operating department in the plant area.

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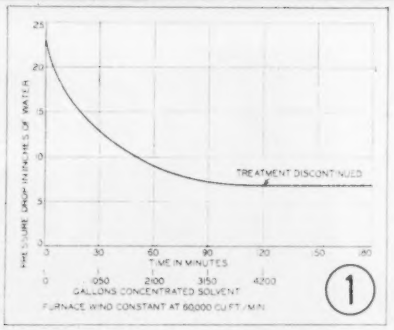


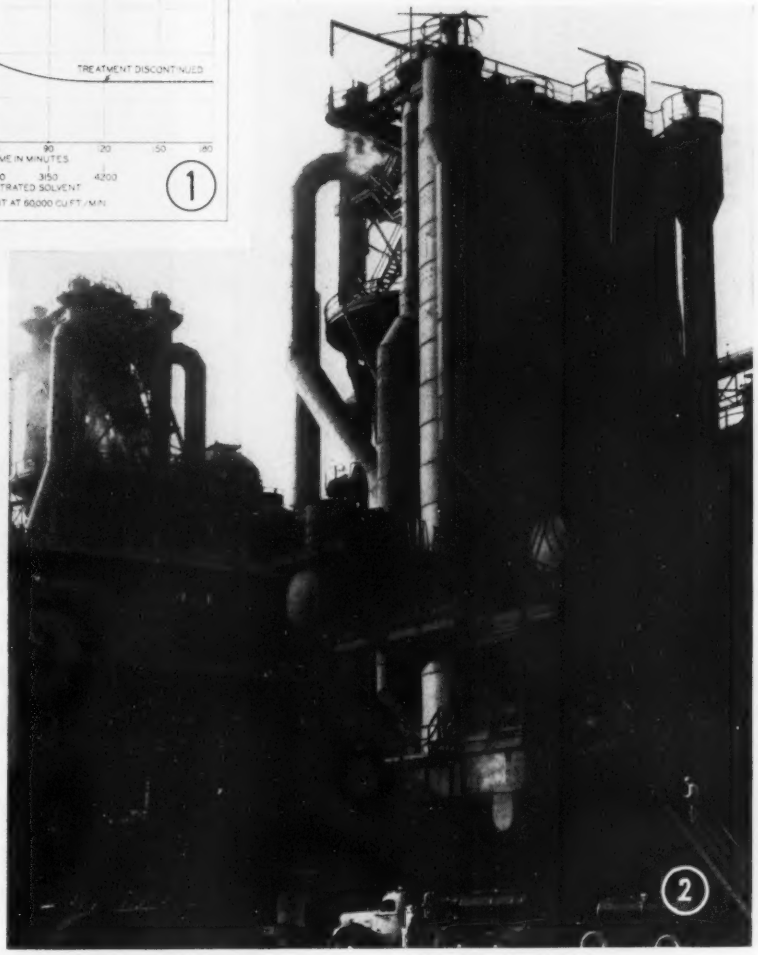


Fig. 1—Process of chemical cleaning operation is indicated decrease in pressure drop through scrubber

Fig. 2—Gas washer serving No. 1 blast furnace, National Tube Co., Lorain, O., being cleaned while in operation

Blast furnace gas cleaning equipment is serviced in a few hours without interrupting operation of vessel or slacking of blast. Technique affords fast, efficient and economical means of removing scale and sludge from wet and dry units

Chemical Process Simplifies

Cleaning of Gas Washers AND PRECIPITATORS

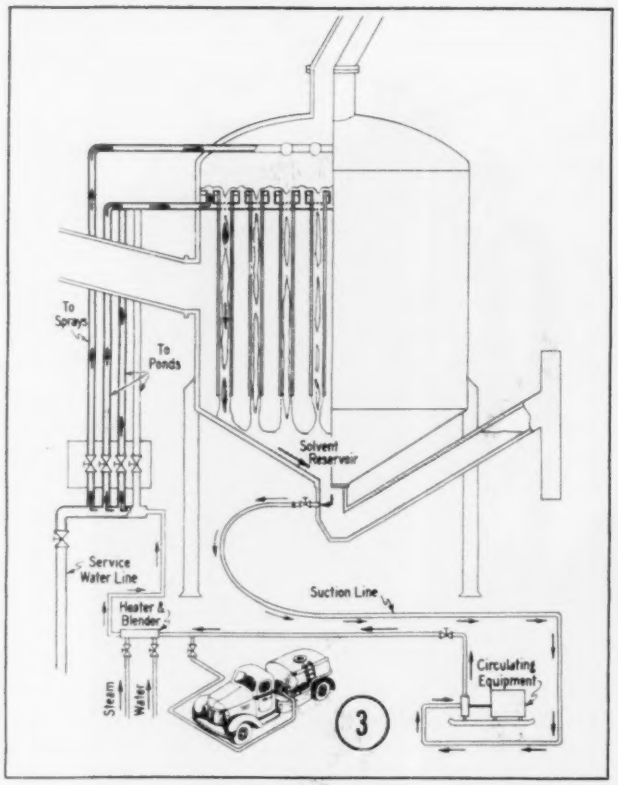
By J. M. HOWELL
Development Engineer
Dowell Inc.
Cleveland

PRODUCTION demands now being made upon the steel industry have placed operational personnel in a particularly exacting position. Blast furnaces and all associated equipment are being operated at greater than design capacities and this creates added maintenance costs.

In the case of blast furnace gas washers and electrical precipitators, unit downtime is an extremely important factor. These units usually cannot be by-passed successfully for any period of time and therefore continued operation of the furnace is largely dependent on their availability. Moreover blast furnace stoves depend on a constant flow of clean gas. Therefore, it is imperative that both washers and precipitators operate at maximum efficiency and without costly shutdowns.

In consideration of wet washers it is obvious that plugging up of the tile or whatever scrubbing medium is used causes back pressure on the furnace resulting in decreased iron production and increased blowing costs. Continued operation of a washer with a high pressure differential costs hundreds of dollars per day. Operators formerly were prone to operate washers at excessive pressure drops because the production loss would be less than the loss incurred by removing the unit from service for cleaning.

The problem of cleaning gas washers now has been relegated to a minor role by the new Dowell process. Washers are being cleaned while in service, without any wind reduction on the furnace and in a matter of a few hours. Pressure drops of 28 to 30 inches water column have been reduced to 5 and 6 inches in a short period of time. In one case of high-top pressure operation, a pressure differential of 140 inches water column was incurred across the washer. The washer was Dowell-serviced and the differential reduced to the normal 26 inches water column in 3 hours and 10 minutes without disturbing the furnace operation.



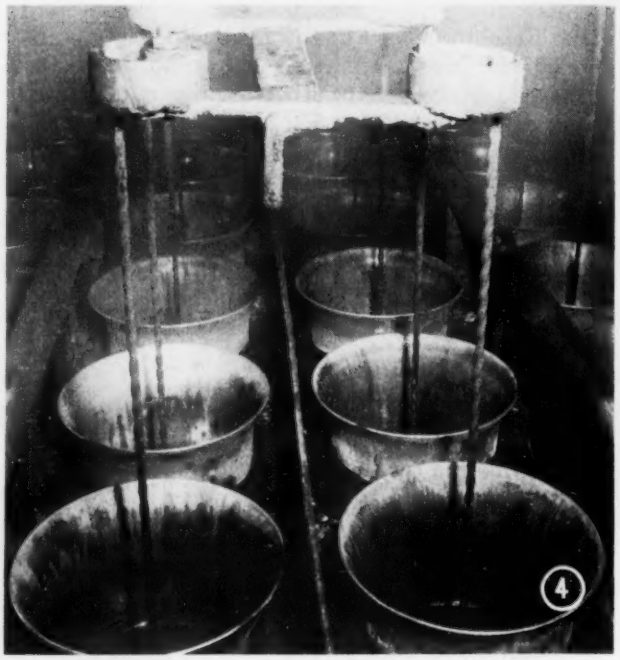
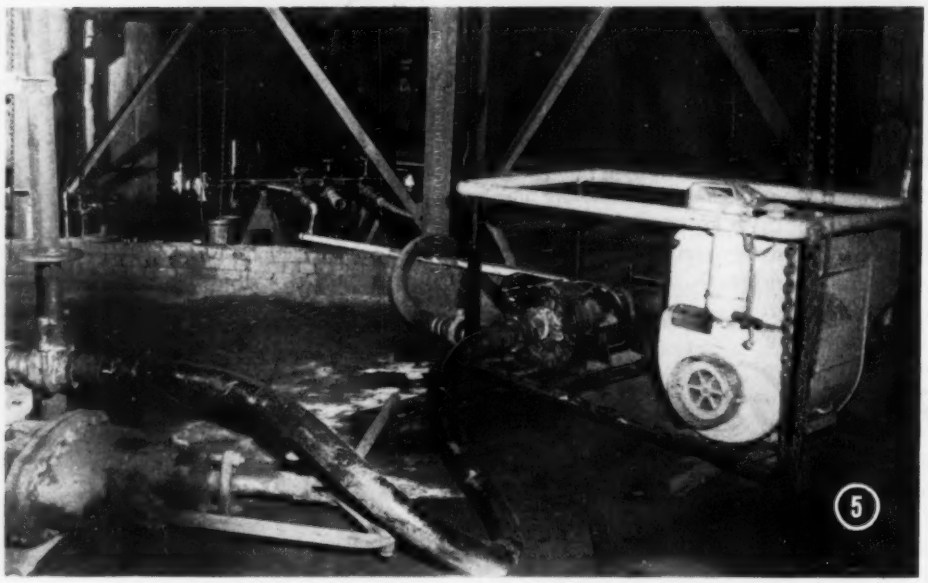


Fig. 3—Schematic diagram showing method of cleaning electrostatic precipitators

Fig. 4—Condition of weirs and tubes following chemical treatment

Fig. 5—Hookup of special circulating pump on precipitator floor



To prepare a washer for service it is only necessary to provide a 2-inch connection on the service water inlet. Any plugged sprays should be opened before treatment. The solvent truck pump discharge is piped solidly to the 2-inch connection on the service water inlet. Concentrated solvent is pumped into the normal water flow at a rate calculated to give a dilute solvent for spraying through the washer. It is possible to clean selectively any part of the washer by closing off certain of the spray rings and forcing solvent to the desired sections.

Careful control of the solvent concentration is maintained by frequent titrations of the fluid discharge from the seal pipe. The strength of the solvent being discharged is low so that waste is kept at a minimum. Almost immediately after beginning the treatment, manometer checks will show the pressure differential being reduced. Amounts of solvent required are estimated according to the type of washer and the degree of pressure drop. An average for all washers cleaned to date has been about 4000 gallons of concentrated solvent. When diluted with the service water this amounts to about 60,000 gallons being sprayed through the unit. The average treatment time has been 4 hours.

On a Brassert washer operating with a 23 inches water column pressure drop while scrubbing 80,000 cubic feet per minute of blast furnace gas, the furnace top pressure was recorded at 60 inches water column. This unit was packed with four tiers of spiral-type ceramic tile. Mercury manometer readings were taken across each bank of tile and proved that the obstructions were in the tile and not in the gas inlet.

Treatment was started at 9 a.m. Fig. 1 shows by graph the reduction of pressure, elapsed time and volume of concentrated solvent used. At 9:30 the pressure differential had dropped to 13 inches water column and by 11 a.m. was back to the normal 7 inches. Furnace top pressure had also returned to 40 inches water column.

Careful manometer readings were made across each bank of tile for the ensuing two weeks and no increase in pressure differentials was noted even though furnace wind was 75,000 cubic feet per minute at times.

Unfortunately, a breakout occurred shortly afterward and the furnace was down for a short time. However, this incident presented the first opportunity available to examine visually a washer of this type following chemical treatment. Upon inspection the upper three tiers of

...in one setting... in 10 minutes...19 separate operations!

ON THE POTTER & JOHNSTON 6DRE AUTOMATIC

—that's tooling for you

—the kind of time and money saving tooling that production-minded executives and engineers have learned to look for when they put it up to Potter & Johnston.

You can never be sure that your parts production is accomplished the fastest, most accurate, most economical way until you let P&J engineers have a look at the parts or prints and compare their tooling recommendations and time estimates with what you're doing now. Why not see what they have to say. It puts you under no obligation.

The Steel Forged Oil Well Drill Bit pictured above is gripped by a 3 jaw chuck, and here is what happens to it on the P&J 6DRE Automatic:

1st T. F.: Drill inside dia. to depth; turn O.D. straight to chuck jaws; remove portion of stock from bevel.

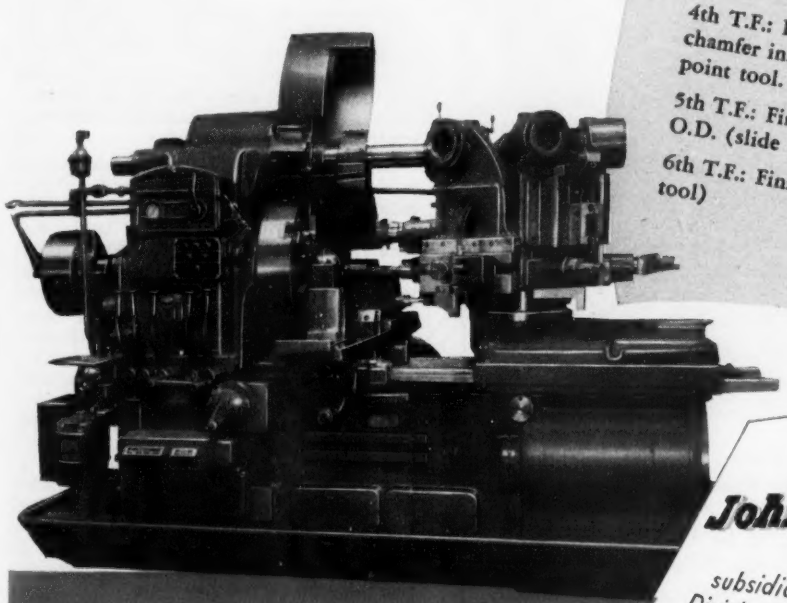
2nd T. F.: Rough bore two inside dias. and face bottom of one dia.; remove portion of stock from bevel.

3rd. T.F.: Form radius and angle on outside dia.; remove remaining rough stock from bevel; rough face end; rough C'bore 3.798" dia.

4th T.F.: Finish bore three inside diameters, chamfer inside dia.; machine bevel with single point tool.

5th T.F.: Finish bore inside dia.; turn taper on O.D. (slide tool)

6th T.F.: Finish face end; form ball race (slide tool)



Potter & Johnston Company
Pawtucket, R. I.
subsidiary of Pratt & Whitney
Division Niles-Bement-Pond Company

P&J

6DRE AUTOMATIC

tile were found to be perfectly clean. The lower bank showed a slight deposit adhering to the surfaces of the tile which apparently had been deposited from operations after treatment.

This particular unit now has been in operation for about one year and the pressure differential has risen gradually until it is now 15 inches water column. The operator, not wishing to continue at any greater pressure drop, has ordered another treatment.

Wet washer equipment in the Lorain Works of the National Tube Co. consists of three tile washers for each furnace. These washers are considerably smaller than the 75,000 unit previously discussed but their combined capacity is 85,000 × 1.37 or 116,450 cubic feet per minute. All three washers were operating at differentials of 24 to 26 inches water column. The north washer on furnace No. 4 had just previously been manually cleaned and was operating with a 6.8-inch water column pressure drop. This manual cleaning had required three days time and 768 manhours. Furnace wind was reduced about 15 per cent during the cleaning operation since there were only two washers in service for the furnaces.

The other two washers were Dowell-serviced simultaneously, while in operation, the job being completed in 4 hours. Final differential readings on the middle and south washers were 5.6 and 6 inches water column respectively. Since this treatment 30 washers have been cleaned by this process.

Cleaning of electrostatic precipitators has long been a burden to blast furnacemen. Mechanical methods of cleaning ponds, weirs and tubes have been long, tedious processes, and, at best, could not be considered as efficient. Tube and weir life has been far too short due to the pit corrosion often experienced in precipitator operation. This corrosion can be attributed in the main to the iron oxide and calcareous deposits adhering to the inner surfaces of the tube. Most mechanical methods of tube cleaning do not remove these deposits from the pits and thus do not arrest the active corrosion.

The technique of cleaning precipitators as developed by Dowell now affords the operator a fast, efficient and economical method of removing scales and sludge. Complete 2-section precipitators can be cleaned in less than 12 hours, using the following method:

Preparation for Treatment

1. Weld 3-inch connection to drain line just below vortex of the cone.
2. Make 3-inch connection on service water inlet.
3. Section being cleaned must be removed from service, purged and opened.
4. Steam, water and solvent connections must be made to mixer and heater, as shown in Fig. 3.

Procedure for Treatment

1. Close all pond drains and unit drains.
2. Concentrated solvent is pumped from solvent trucks to mixer on precipitator floor where it is blended with water to a 10 per cent solution. This solution is allowed to proceed through the flow meters, into the ponds, and down the tubes into the bottom cone of the precipitator.
3. As soon as 3000 gallons of 10 per cent solvent have been pumped in, the solvent pump on the truck is shut down. The skid-mounted pump located on the precipitator floor then is started and circulation maintained to all ponds in the section. After circulation is established steam is injected into the acid stream to maintain a temperature of 140° F. As the solvent is circulated through the ponds and down the tubes it dissolves and disintegrates the adhering scale and sludge deposits.
4. When the solvent concentration has dropped below 3 per cent, circulation is stopped and the spent solvent is drained from the unit. At this point the ponds, weirs and tubes are given a vigorous hosing with water to remove softened material.
5. Then 3000 gallons of 5 per cent solvent is pumped to the precipitator and circulation established again. After a short period of circulation the acid concentration will begin to level off indicating that the deposits have been removed. When the concentration remains consistent for a period of 15 minutes the precipitator is again drained and flushed. The average time for cleaning one section of a precipitator has been 4 hours. Cleanliness of tubes and weirs has been 90 to 100 per cent.

This unit was a one section precipitator located in the Campbell Works of the Youngstown Sheet & Tube Co. It contained 340 eight-inch tubes with stainless steel wires. An-

SPEEDY STUDDING: Up to four studs per minute are permanently affixed to this large petroleum dewaxing cylinder through use of this cradle fixture for semiautomatic studwelding. Designed by Plate Welding Division, General American Transportation Corp., to be used with a Nelson studwelding gun, the carriage indexes along the fixture track and the welding cycle, initiated by a pull on the gun's trigger, is automatically controlled to localize heating effect of the weld while guaranteeing unimpaired weld strength. After studwelding, a milling head is mounted on the track to finish off stud heads to close tolerance. Upon completion of a row, cylinder is revolved for the next row of studs

other precipitator was put in service while this one was removed for cleaning. The treatment was started at 9:30 a.m. Oct. 20, 1948 using the procedure just described. Four alternate ponds circulated at a time and while this was being done, the primary four were being hosed.

At 1:00 p.m. the solvent concentration had leveled off at 3.4 per cent. Circulation was continued until 1:20. The unit then was drained and thoroughly flushed with water. Inspection revealed all weirs and ponds to be 100 per cent clean. A few tubes had narrow streaks of scale down their sides, indicating the weirs on those tubes were not level. This scale, however, was soft and could be washed off easily with high-pressure water. The streaks made it a relatively simple matter for the operator to correct the weir positions. Complete cleaning of this unit was accomplished in 4 hours.

Operators of these four sections of precipitators at another plant were well aware of the corroded condition of the weirs and pond walls. However, time was important and it was decided to Dowell-service these units in order to reveal all defects and corroded areas so that they could be replaced immediately. The operators estimated three days to clean a section manually. The clean gas requirement was so high that only one section could be removed from service at a time.

All four of these sections were cleaned in an average time of 3 hours and 45 minutes per section. The downtime saved was approximately 177 hours. The savings in manhours approached 1100.

From paper presented at annual winter meeting of the Eastern States Blast Furnace and Coke Oven Association, Pittsburgh, Feb. 11.

Furnace Channel Flushing Provides Fluxing Action

System of channel flushing, developed by Fisher Furnace Division of Lindberg Engineering Co., Chicago, serves to keep channels between the 2-chambers of Lindberg-Fisher induction melting furnaces clean and free of slag or oxide accumulations. Primary coil of the furnace transformer is located in a manner to cause a greater volume of molten metal to be impelled into one chamber than the other. This raises the molten metal level in the one chamber and at the same time lowering the level in the other chamber.

Every 60 seconds when the power is cut off, the higher level subsides, and the molten metal flows to the other chamber until the same level exists in both. When the current is restored, the molten metal is forced in the opposite direction, again causing a higher level in one chamber than the other.

Furnace control equipment automatically interrupts the power once a minute, allowing "channel flushing" to take place twice a minute, once in each direction. The flushing that occurs when the power is interrupted is the more important of the two flushings, as impurities and dross are released from the magnetic field surrounding the channels that connect the two chambers. The constant flushing, stirring and mixing action is said to insure metal of uniform analysis and also cause a beneficial fluxing action.

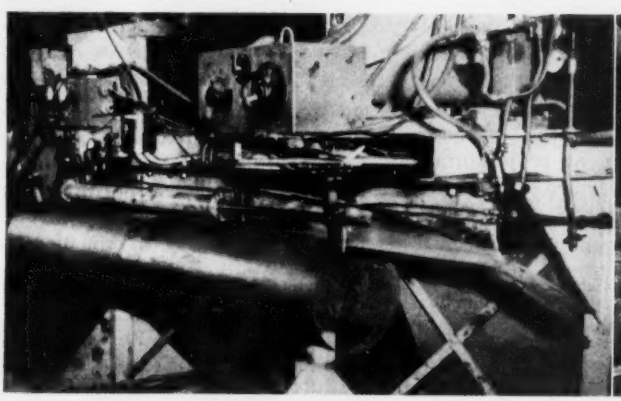


Fig. 1—Loading end of continuous welding mill

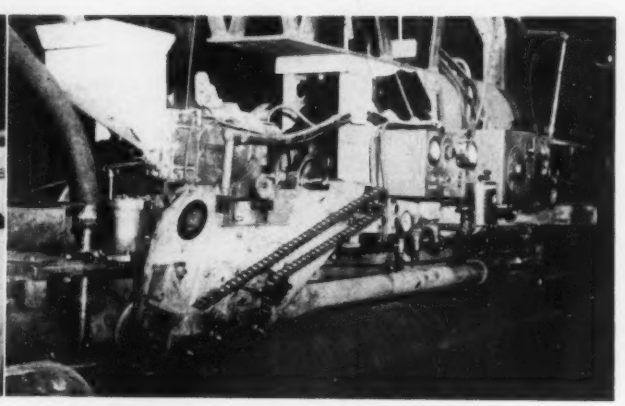


Fig. 2—Chain drive used to move shells at proper welding speed. Photos courtesy Linde Air Products Co.

Various Tank Diameters

Welded on One Machine

REGULATION of the welding current and the air pressure are the only adjustments necessary on a semicontinuous seam welding machine created by Southern Heater Co., Compton, Calif., for joining hot water tanks of various diameters in its plant. Flexibility of the unit is such that small lots of various diameters are processed without shutting down the machine to adjust for each size tank. For example, shells from 14 gage to $\frac{3}{16}$-inch thick are welded in any succession, the unit being capable of welding at 48 ipm.

Longitudinal seam produced by the machine in joining the shells are made by the Unionmelt welding process. Welds penetrate completely and are made without spatter. Very little operator skill is required to operate the machine. Cylindrical shells are merely fed into the welding mill by the worker. A pneumatic ram then forces each section against the preceding one, and a chain drive moves the shells at welding speed beneath the welding head. A water-cooled copper shoe under the welding zone backs up the completely penetrated welds. Because shells are fed through the mill on the lower flanges of an I-beam support, shells from 8 to 48 inches diameter can be handled by the same fixture. Accompanying illustrations show both the loading end of the continuous welding setup and the chain drive that moves the shells at the proper welding speed.

Sheet Forms of Corrosion Resistant Stainless Made

Corrosion resistant stainless steel, previously available in wrought forms of bar stock, wire, strip, tubing and pipe, now is being made available in sheet and plate form by Carpenter Steel Co., Roselle, N. J. Up to the time of its introduction in the wrought forms, the material was available only in cast form as Durimet 20, from Duriron Co. Inc., Dayton, O.

Previously made on an experimental scale, the production of the new stainless No. 20 sheet and plate is now on a commercial basis, the company states. Sheet is produced in standard widths and lengths in gages from 24 to 11, while plate is produced in thicknesses from $\frac{3}{16}$-inch up.

Said to have excellent resistance to the corrosive effects of sulphuric acid, the new form of stainless may see application in pump shafts and rods, valve parts, screens, pipe lines, heat exchangers, fume ducts, etc. Analysis of the alloy is as follows: Carbon, 0.07 per cent maximum; manganese, 0.75 per cent; silicon, 1.00 per cent; chromium, 20.00 per cent; nickel, 29.00 per cent; molybdenum, 2.00 per cent minimum; copper, 3.00 per cent minimum.

Shock Absorption Built Into Drop Hammer

Use of electronic measuring instruments has made it possible to analyze the effect of the impact created when a drop hammer strikes and to study the resultant stresses throughout the hammer. This technique, utilized by Chambersburg Engineering Co., Chambersburg, Pa., has resulted in the incorporation of shock absorption devices to cushion vital parts in the Ceco-Drop hammers made by the company.

Company engineers, although not sure that they can design a forging hammer that is not a self destructive tool, feel that this "shock absorption engineering" will increase the life of the hammer. An example of this research is the use of Fabreeka pads to dampen shock waves traveling upward through the hammer structure. A shock absorber, similar to the type used on automobiles, absorbs the shock transmitted through the valve operating mechanism of the tool, it is stated. Thick rubber bushings protect certain pivot point in the mechanism and the problem of piston rod breakage also has been controlled by this engineering analysis.

New Roll Grinding System Uses

ABRASIVE BELTS

ABRASIVE belts are the cutting medium used by a newly-developed system for roughing and finishing of all types of rolls. It can be used on rolls with or without removing them from the rolling machine. Rubber, copper, steel and bimetallic rolls which are difficult to grind by other methods reportedly can be ground to close tolerances and to a fine finish by the new principle.

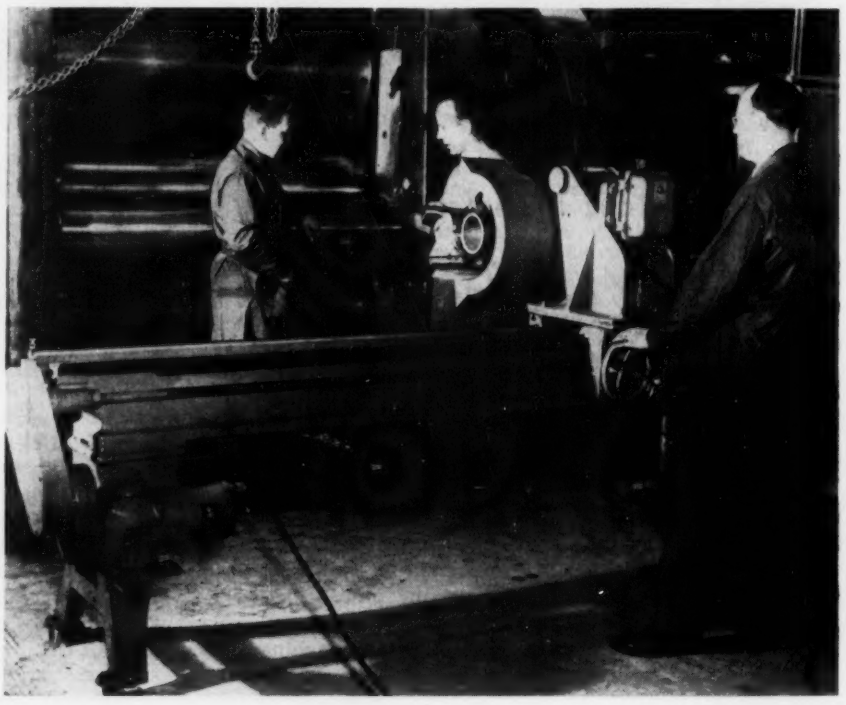
Aluminum oxide belts of 24 to 36 grit are used for roughing all types of rolls. Finish polishing is with silicon carbide belts of up to 600 grit. It is stated that very little pressure is used on the belt, with the consequence that very little heat is developed. Belt pressure against the work roll can be accurately controlled.

Elimination of ways with this principle is said to have reduced to a minimum the problem of aligning the machine. This also permits the grinding of heated rolls with no disturbance of grinder alignment, as there is no sensitivity to thermal distortion.

An infinitely variable traverse is incorporated which does not force the traverse at any time. If roll irregularities are too pronounced and tend to overload the traverse, it automatically eases off and resumes its normal rate after the irregularity has been ground away, the company states. Cambering can be performed and crowns of specified magnitudes or shape can be ground.

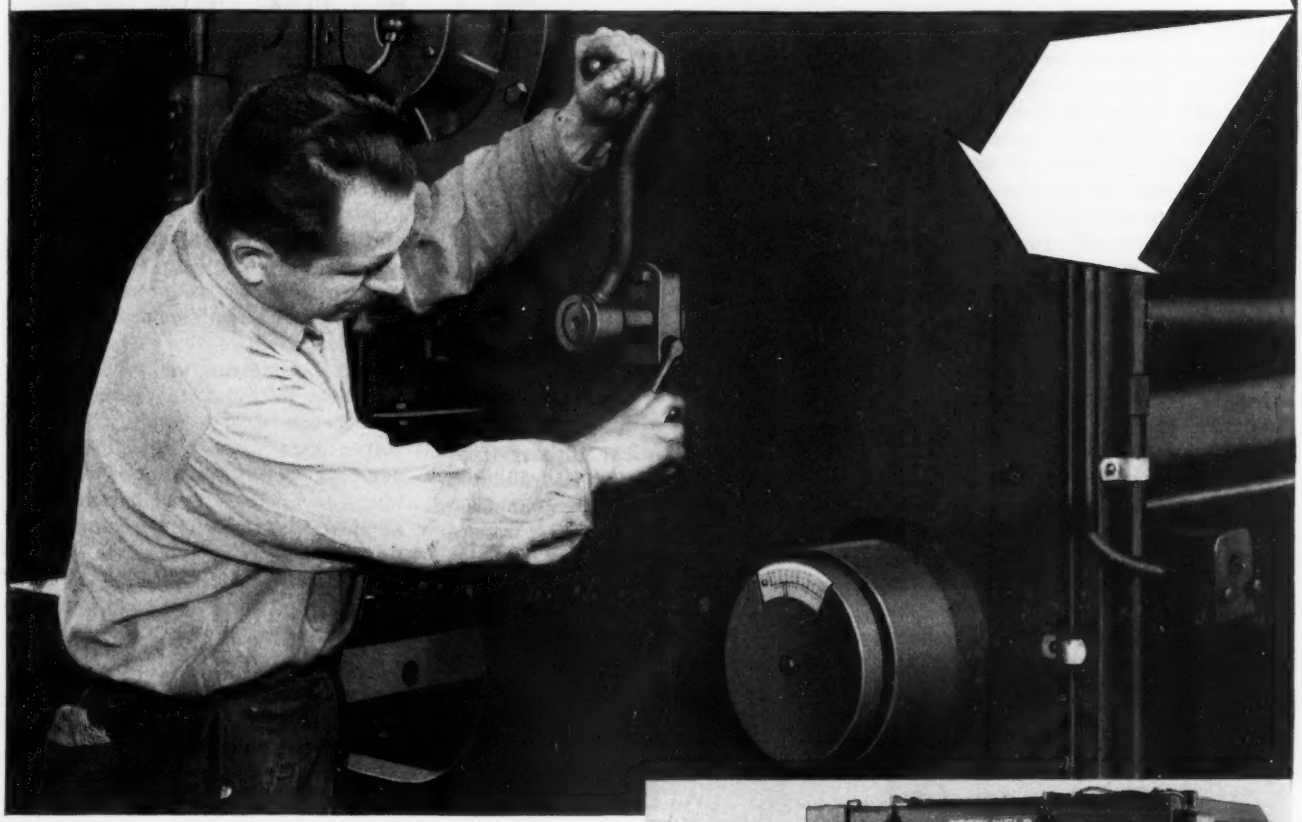
Rolls being ground are revolved between 50 and 100 rpm for rough grinding, depending upon the type of material being ground. Finishing is at the speed of 25 to 50 rpm. A 4-inch belt is used on steel rolls; a 6-inch belt on rubber rolls. Belt is operated at a constant speed of about 2200 fpm. Feeding-in mechanism, for regulating the depth of cutting action, is adjustable to 0.0001-inch.

Ryman Engineering Co., Ellwood City, Pa., has an exclusive license to produce the machines and to handle the grinding service, performed on a contract basis. Machines used remain the property of the company.



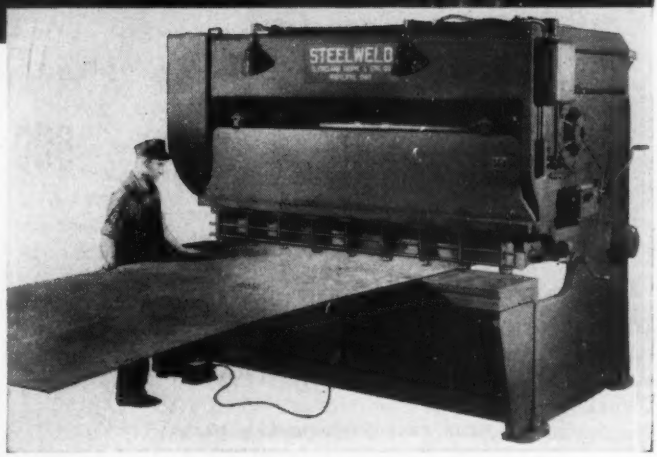
Co-designers of the roll grinder, Eric Isakson, left, and Dr. R. G. Minarik, center, are shown inspecting an "in-machine" roll grinding setup with Dean Anderson, right, of Ryman Engineering Co.

KNIFE CLEARANCE *Easily Adjusted* FOR ANY THICKNESS . . . . .



THERE is a direct relation between thickness of plate cut and clearance between knives for most satisfactory results. To properly set this clearance when changing from one plate thickness to another has been made extremely simple in Steelweld Shears.

The need of moving the shear bed, adjusting various nuts, testing the knife clearance with feelers, etc., has been eliminated. Such bothersome, time-consuming work has been reduced to the mere turning of a convenient crank. A large dial indicator indicates the clearance in thousandths of an inch and also shows the plate thickness that may be cut for any knife setting. Because knife adjustment has been made so easy, operators willingly make it on Steelweld Shears and thereby get the best possible cuts for every plate thickness—and knives remain sharper for longer periods.



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STEELWELD PIVOTED BLADE SHEARS

Hot Extrusion Methods

(*Concluded from Page* 85)

at which the metal can be deformed the greatest extent with the least effort without impairing its quality. Due consideration should be given to the temperature increase during the actual extruding operation, which is caused by the internal friction set up by the rapid deformation. If maximum forging temperatures are used, this additional heat may be enough to damage the steel by overheating. Temperature of 2240°F is considered satisfactory for the front wheel spindle extrusion.

This method of producing hot formed steel shapes has several advantages both economic and engineering. Among the former are: Savings in steel, amounting to about 30 per cent. Billet weight for the old method is 7½ pounds per spindle, while the billet weight for the extrusion is 5½ pounds. This represents a saving of approximately 10 tons of steel per day that would otherwise be discarded as scrap in the form of flashings. Among the other savings are: Floor space—80 per cent; die costs—40 per cent; labor—65 per cent. Previous methods required 46 men while the extrusion method for the same schedule requires 16 men. There is also a noticeable saving in equipment upkeep, greater flexibility in case of model changes and improved working conditions. One of the engineering advantages is increased strength for equal sections resulting from near approach to ideal fiber flow conditions, Fig. 5.

From a paper presented by the authors at the SAE annual meeting, Detroit, Jan. 10-14, 1949.

Industrial Vision Testing Report Issued

Four out of every 10 industrial workers are visually unqualified to perform their jobs safely and satisfactorily and most of these people are totally unaware of their visual limitation, according to a report, *Eyes Right for the Job,* issued by Bausch & Lomb Optical Co., Rochester, N. Y. Described in the report are the results of the optical firm's visual testing program that has validated visual standards for more than 2000

The program, operated in conjunction with Purdue University, includes scientific performance testing with the Ortho-Rater, a testing instrument for determining individual characteristics of vision that have proved important to job success by placing applicants in jobs for which they are visually qualified. Also included are case histories showing how the program aids worker efficiency and also reduces accidents, rejects and waste.

Cold Steel Extrusion Report Available

New data on the cold extrusion of steel is available to industry in a 138-page report published by Office of Technical Services, Department of Commerce, Washington 25, D. C. It covers work done for the Army Department by the Heintz Mfg. Co. of Philadelphia to adopt German-developed technology in this field to American productive processes.

While research described is related specifically to several ordnance items, the information is of use in any field in which the extruding of low carbon steel is useful, the OTS states. One section deals with the development of automatic phosphatizing techniques. Phosphatizing, the application to steel of a lubricating finish for cold extrusion, is said to be the key to the process' success.

Illustrated with photographs and blue prints, the report, designated as PB 96704, is available for $17.50 in photostat form, $5.50 in microfilm.

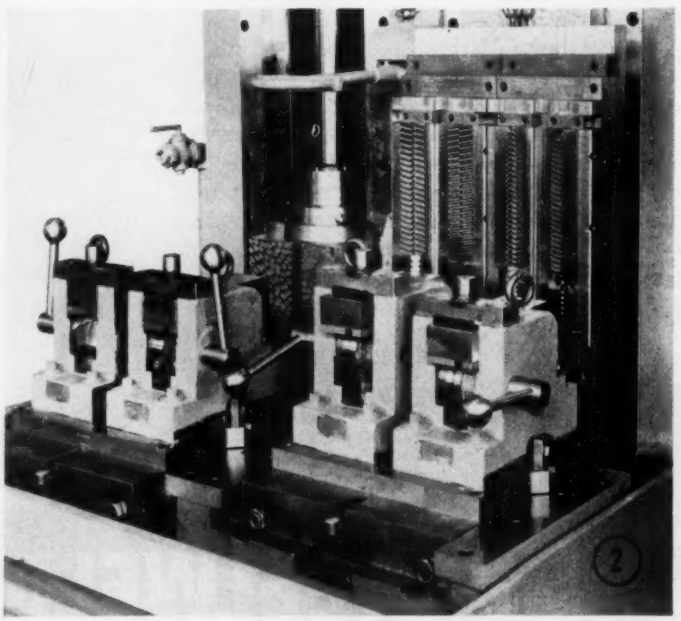
Major Auto Plant Broaches

600 Connecting Rod Caps Per Hour

SIX-HUNDRED connecting rod caps in two styles are produced on one machine each hour at one of the major automobile companies. Four operations are performed each cycle on a 5-ton, 42-inch stroke dual-ram surface broaching machine, Fig. 2, manufactured by Colonial Broach Co., Detroit.

Left hand ram produces two parts like the one shown at right in Fig. 1, for each cutting stroke; operation consists of broaching the parting face and sides of the bosses, simultaneously. On the right hand ram two parts like the one shown at left Fig. 1, are produced. Operation here to broach the stepped faces on both sides of the half-round, including a 1/32-inch-45 degree chamfer joining the two steps in both faces.

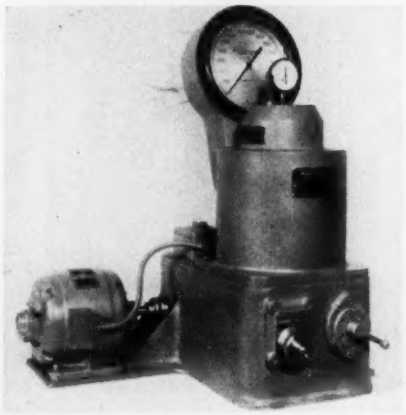
Thus the machine finishes the connecting rod caps as to both parting faces and for side locating. Finish is sufficiently accurate so that these faces can be used as reference points.



New Products and Equipment

Ductility Testing Machine

Complete tests in as little as 15 seconds are possible with the new bench model ductility testing machine for testing drawing qualities of sheet metal, built by Steel City Testing Machines Inc., 8843 Livernois Ave., Detroit 4, Mich. The 2 foot 11-inch high, 26-inch wide machine has a speed of piston travel which is adjustable within a wide range by a dial setting. It has a capacity of 15,000 pounds to cut test material in up



to ⅛-inch thickness or 30,000 pounds for material up to ¼-inch in thickness.

Machine is motorized and hydraulically operated, incorporating two concentric pistons. The outer piston grips the test piece against the head at the top of the machine while the inner piston makes the cup in the specimen. Protected against overloading, an 8½-inch diameter gage shows pressure at which yield in the specimen occurs. An indicator shows depth of draw at any moment by a direct reading.

Check No. 1 on Reply Card for more Details

Plug Gages

When one end of the reversible plug gages made by Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford 1, Conn., has worn out, it may be replaced with the other end. A colored locking nut, colored green for go and red for not go, is unscrewed and the gaging member in the bushing is reversed. These gages are furnished as cylindrical or thread plugs.

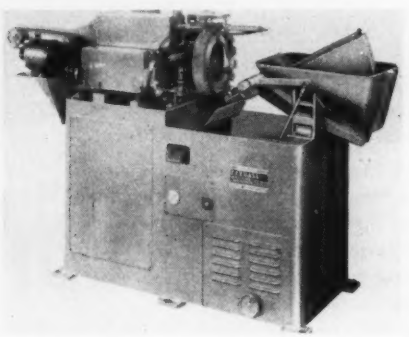
Cylindrical members are made to American gage design standard in sizes from 0.030 to 0.510-inch in steel, chromium plate and carbide. Thread tolerance for checking NC and NF gage members are furnished to X threads in sizes from 0 to ½-inch. The "pilot feature" may be added to cylindrical members above 0.240-inch in diameter to facilitate easy entry into close tolerance holes.

Check No. 2 on Reply Card for more Details

Slug Heating Machine

When used with an induction heating unit, the slug heating machine made by Feedall Machine & Engineering Co., 70 Vine St., Willoughby, O., becomes a completely automatic slug heater. Parts are dumped into the large hopper at the rear of the machine from which they are fed into the transfer dial and then loaded into the inductor coil. As each new slug is loaded into the coil, another piece ready for forging is delivered at the machine.

Machine illustrated is for heating 1 x 1-inch slugs at a rate of approxi-



mately 20 per minute. This unit can be adjusted for other diameters and production speeds in proportion to stock used. Entire machine is driven by a ½-hp motor and is equipped with a variable speed drive. All transfer and pushing movements are air operated.

Check No. 3 on Reply Card for more Details

Dust Collector

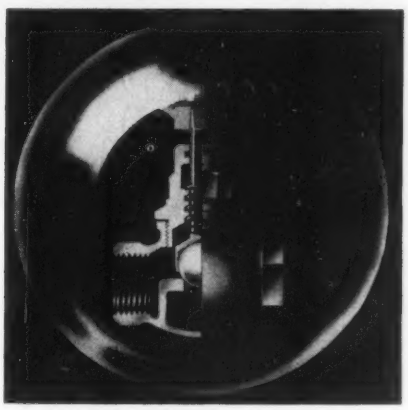
Entirely self-contained, portable and installable without wall or floor cutting or duct work, the model 800 Dustkop dust collector, made by Aget-Detroit Co., 309 Main at Washington, Ann Arbor, Mich., is designed to collect dust, dirt and lint from medium size grinding, buffing and polishing operations and shavings and sawdust from belt and disk grinders. Unit develops a rated 746 cfm at 8000 fpm velocity, with 3.7 inches water lift.

Principle of operation employs a paddle wheel self-clearing fan, direct driven by a continuous duty ¾-hp, 3600 rpm motor, which creates the suction to remove the dust from the source. A cyclone separator within the unit removes the majority of the dust and dirt from the air stream, allowing only the extremely fine dusts to be trapped by the spun glass filter which forms the top of the unit. Dust and dirt removed from the air stream are deposited in the removable drawer of the dust collecting bin which forms the base of the unit. On average installations, shake-down of the filter is required infrequently.

Check No. 4 on Reply Card for more Details

Ball Valve

A precision ground stainless steel ball which replaces disk or poppets is the seating member of Bull-Dog ball valve, offered by Carpenter Mfg. Corp., 9523 Detroit Ave., Cleveland 2, O. The ball is spun into its retainer, allowing a slight clearance which permits the ball to spin when the valve is opened or closed, thus permitting the ball to find a new seat. Holding of ball clearance accurately



prevents chatter when opening, closing or throttling the valve.

Valve is supplied with O-ring seals for normal service where high temperature is not involved. Steam packing is used in valves installed in steam or other high temperature service. At present, valves are available in ½ and ¾-inch pipe sizes, in brass.

Check No. 5 on Reply Card for more Details

Sheet Metal Press

Exceptionaly large dimension deep draw jobs may be handled with the Fastraverse sheet metal drawing press of 1000/500-ton pressure capacity, designed by Hydraulic Press Mfg. Co., Mt. Gilead, O. Press has a platen of 70 x 72 x 120 inches and a 36-inch ram travel. It is equipped with a 300-ton hydraulic die cushion

Experience LOOMS LARGE

Mathews Engineers are Specialists in Heavy Materials Handling

•Steel men wouldn't trust an open-hearth heat to an inexperienced man. For such key functions they demand that experienced people be in charge — people who know exactly what they are doing.

So it should be with conveyers. Problems involving the efficient handling of coils, sheets or plates likewise require the attention of experienced people — specialists in heavy materials handling.

For many years Mathews Engineers have devoted the greater part of their time to the conveying problems of heavy industry. They have worked diligently to meet the requirements of steel plant engineers with heavy Roller Conveyers, Chain Conveyers, Roller Tables and a great many items of highly special heavy conveying machinery.

Today the Mathews organization makes available to Steel Mills and Foundries the facilities of three modern plants, and a wealth of experience in designing and building conveying equipment that will stand up under severe service.

MATHEWS CONVEYERS

GENERAL OFFICES . . . . . *Mathews Conveyer Company*
ELLWOOD CITY, PENNSYLVANIA

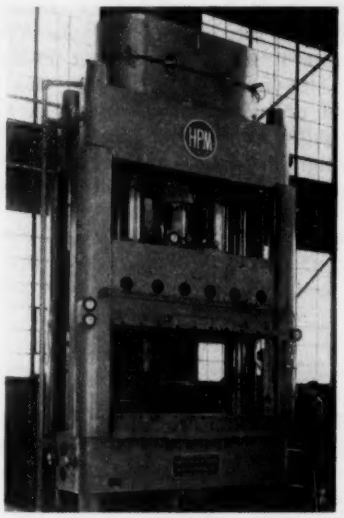
PACIFIC COAST DIVISION . . *Mathews Conveyer Company, West Coast*
SAN CARLOS, CALIFORNIA

CANADIAN DIVISION . . . . . *Mathews Conveyer Company, Ltd.*
PORT HOPE, ONTARIO

Engineering Offices or Sales Agencies in Principal American and Canadian Cities

with a platen of 48 x 52 inches and 24-inch stroke.

Design incorporates three main rams for the multiple press ram system of operation in two ranges of pressing speed. For a fast preliminary pressing at medium pressure, either the central main ram or the two outer rams can be employed with a 500-ton pressure. At a predeter-



mined position, all three rams can be used to develop the high pressure required for final forming. Where 500-ton pressure is used, pressing speed is 58 inches per minute. With all three rams in operation, pressing speed is 28 inches per minute. Fast-traverse action results in fast travel of ram to the work, a slower, controlled, smooth pressing speed and the rapid return of the ram to neutral position.

Check No. 6 on Reply Card for more Details

Crawler Hand Truck

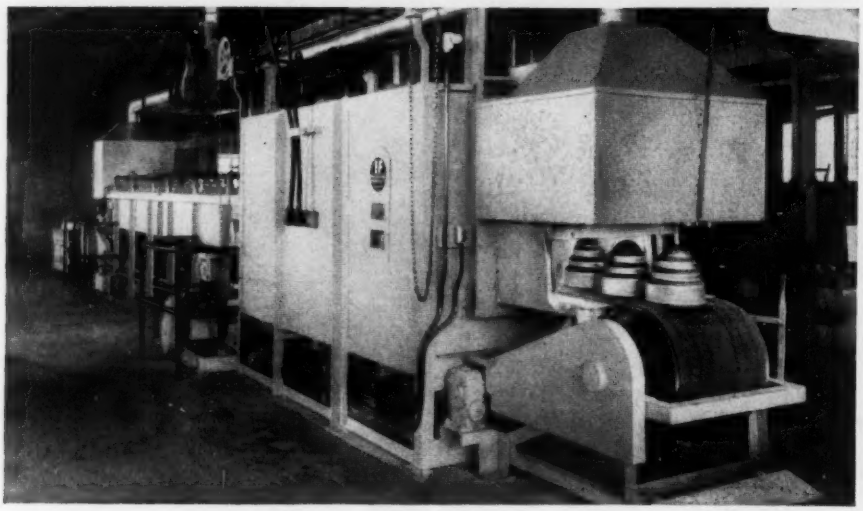
Bulky loads of up to 500 pounds may be moved up and down stairs with the new crawler-type Trak-Truk hand truck, designed by American Machine Works Inc., Racine, Wis. It moves on a crawler base or carriage

equipped with continuous rubber belts. Movement is simplified over curbs, ramps, loading platforms and end gates of vans or trucks. Transporting loads on level surfaces, the Trak-Truk is converted into a rubber tired general utility truck by retracting the crawler base. No metal ever touches the floor.

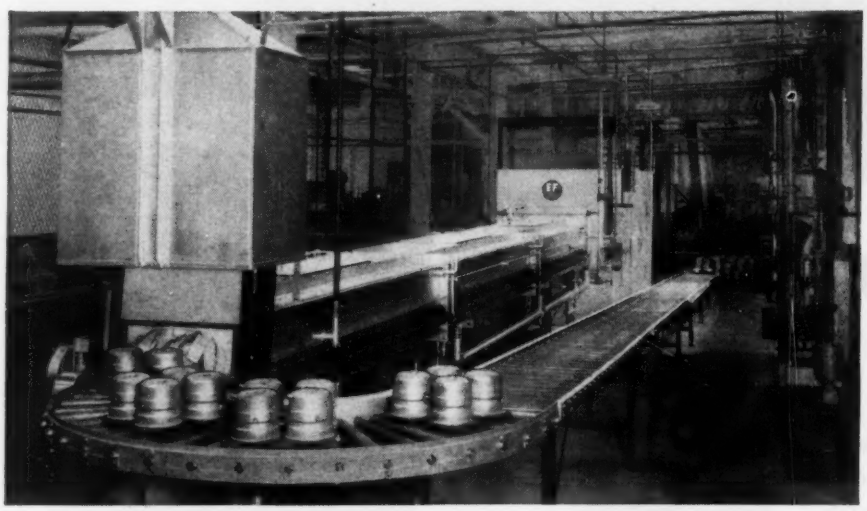
In operation, the two endless rubber belts with heavy tread run over grooved aluminum wheels, mounted

Need Pressings?
Die-cut and pressed shapes from By-Products Steel Co. relieve you of those initial operations. You get right to work finishing the parts, saving considerable time. We have the heavy presses and, in many cases, the very dies needed to make the shapes.
You also save money, because you pay freight only on the finished pieces; scrap is held here where its value is highest. Bulletin 270, containing photographs and descriptions of some By-Products Steel Plate Shapes will be sent on request. For a quotation on your requirements, send blueprints to By-Products Steel Co., Division of Lukens Steel Company, 414 Strode Ave., Coatesville, Pa.
LUKENS
BY-PRODUCTS STEEL DIVISION
BY-PRODUCTS STEEL CO.
STEEL PLATE SHAPES
FLAME-CUT ★ SHEARED ★ PRESSED ★ BENT ★ BLANKED ★ WELDED

EF FURNACE BRAZING



CUTS MATERIAL, TOOLING



AND FINISHING COSTS

● When it's costly to make a part in one piece—make it from several pieces, brazed together. Brazing can save from 50 to 80% in material. The brazed piece will probably weigh less—be stronger—withstand shock and vibration better, and wear longer. Brazing enables you to avoid costly die and tooling charges,—and since the finished pieces are discharged from the furnace uniformly bright, smooth and free from scale,—plating, lacquering, painting or other finishing costs are greatly reduced. Investigate the advantages of EF furnace brazing. Fully descriptive literature, complete with design suggestions, sent promptly. Write today.

EF

THE ELECTRIC FURNACE CO.

GAS FIRED, OIL FIRED AND ELECTRIC FURNACES FOR ANY PROCESS, PRODUCT OR PRODUCTION

Salem - Ohio

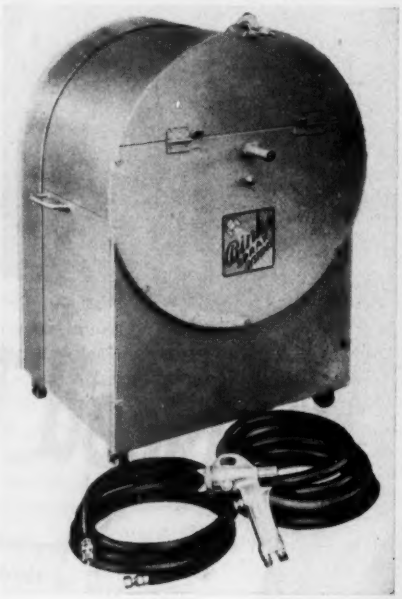
on antifriction needle bearings. Lock-type screws are provided to maintain the correct belt tension. Crawler base pivots on two heavy steel plates. Front wheels are provided with automatic expansion-type brakes and a cable pull on the truck handle. Truck frame is of tubular stock, formed and welded.

Check No. 7 on Reply Card for more Details

Flocking Unit

Handling of fine fibrous material, keeping it dry and in suspension for delivery to the nozzle of a spray gun are problems solved by the production flocking unit made by Binks Mfg. Co., 3114 Carroll Ave., Chicago 12, Ill. The No. FG 12 unit is easy to fill even while in operation.

Used with the unit is the model 172 flock gun which, when used with



the 25-foot length of material hose, needs 4.5 cubic feet of air per minute at 30 pounds pressure. With each 5 pound increase in air pressure, the volume increase is only 0.5 cubic feet per minute. Sound absorbing flock may be applied quickly and in any color.

Check No. 8 on Reply Card for more Details

Conveyors

Various types of crated or packaged merchandise may be moved in installations where the conveyor receiving end is considerably above or below the discharge end with the model B, C or D ship conveyors, made by Wehle Conveyor Co., 201 Water St., Binghamton, N. Y. Discharge end of conveyor is mounted upon a caster-equipped, counterbalanced dolly with floor lock. Movement of conveyor up and down is by

You can make it better with . . .
Pittsburgh Seamless Mechanical Tubing
For farm equipment—other machinery, Pittsburgh Seamless Mechanical Tubing will help you make a better product—save you time and money too. It has the size accuracy, surface finish and ductility that makes for ease of fabrication of many mechanical parts. A wide choice of carbon, alloy and stainless grades permits an economical selection of physical properties to suit your design. For information on how to order Pittsburgh Seamless Mechanical Tubing write: Pittsburgh Steel Company, Grant Building, Pittsburgh 30, Pa.
P
Pittsburgh Steel Company

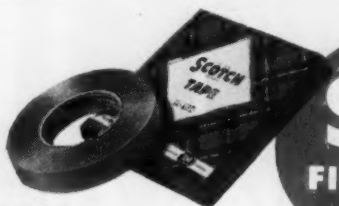
BUNDLING LIGHT STEEL PIPE is fast and simple with new "SCOTCH" Filament Tape No. 880. Note how tape grips each pipe, prevents side slippage.

A new tape... flexible, waterproof... 12 Times Stronger!

Here's the tape for bundling or strapping steel stock and other heavy materials! Rayon filaments reinforce this tape as steel rods reinforce concrete —give up to 12 times the strength, 50 times the tear-resistance of many industrial tapes now on the market. You've got to see this amazing new tape—and try it—before you'll believe the tough jobs it can do. Why not have one of our tape engineers show you how this tape—and other "SCOTCH" Pressure-Sensitive Tapes —can save you time and money? There's no obligation for his services. Write us, care of Dept. ST.4, about your packaging and sealing problems today.

Quick facts about "SCOTCH" Filament Tape No. 880

- FAST—Pressure-sensitive adhesive holds at a touch. Thin caliper gives flexibility for easy handling . . . tape can't be scuffed loose.
- SAFE—No sharp edges to cut into cartons, or mar finishes.
- STRONG—Use it for all types of heavy strapping. It'll handle the most rugged jobs.
- ECONOMICAL—Requires no skilled labor or special equipment for application or removal.



REG. U.S. PAT. OFF.
SCOTCH BRAND
FILAMENT TAPE
No. 880

ANOTHER 3M COMPANY PRODUCT

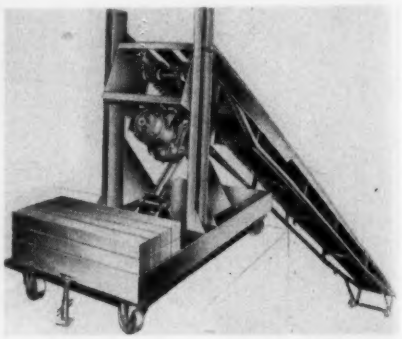
Made in U. S. A. by

MINNESOTA MINING & MFG. CO., St. Paul 6, Minn.

General Export: DUREX ABRASIVES CORP., New Rochelle, N. Y.
In Canada: CANADIAN DUREX ABRASIVES LTD., Brantford, Ontario

hydraulic lift. An enclosed, ball bearing type 1 hp motor is used to power the conveyor. Models C (illustrated) and D are portable. Model B, not portable, is for inside of ship or from deck to deck.

Models B and D will operate at angles up to 40 degrees. Standard

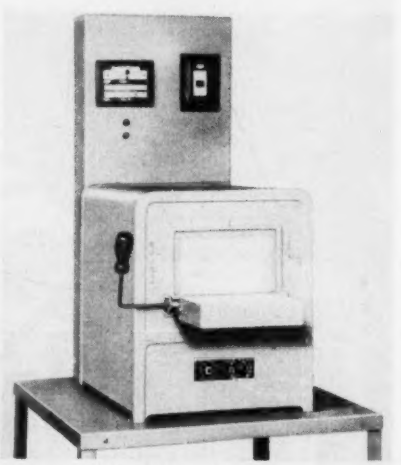


width is 24 inches. The conveyor chute is of 13-gage steel. Two fingers operating in slots in the chute move packaged articles up the conveyor. The roller steel drive chains are capable of supporting 660-pound working load.

Check No. 9 on Reply Card for more Details

Electric Furnace

Experimental testing, enameling, fusing, igniting, precipitate drying and ashing in physical and chemical laboratories are uses for the new electric laboratory furnace announced



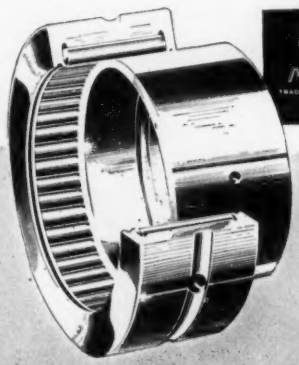
by Cooley Electric Mfg. Corp., 38 S. Shelby St., Indianapolis, Ind. Also useable as a pilot furnace in metallurgical laboratories, it is available either with hearth or vertical sliding door, built-in selector power modifier and manual or automatic control. Temperatures range from 300 to 2000° F. Models with forced air circulation are available.

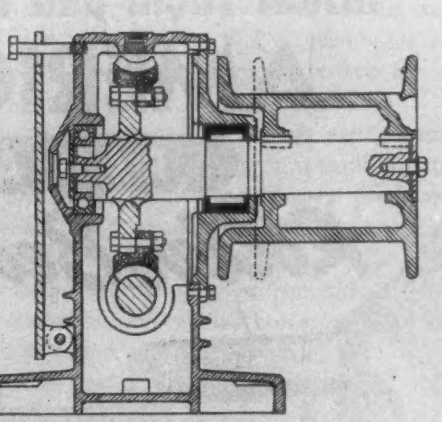
Outer shell of furnace is of heavy gage sheet steel, supported between cast iron and frames. Shell is heavily lined with precut high-tempera-

design anti-friction efficiency into out-moded plain bearing applications

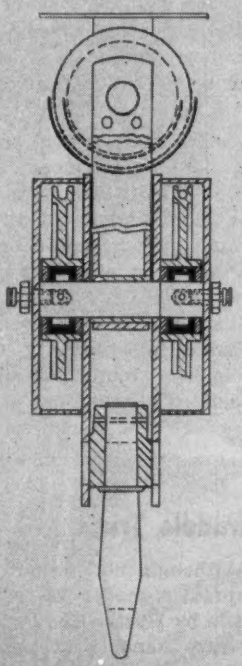
THE MULTIROL WAY

When design demands maximum load capacity in limited space . . . plus top anti-friction performance . . . get results with MULTIROL SE Series full type roller bearings. MULTIROL SE Series bearings afford definite performance advantages over friction bound plain bearings. They increase machine efficiency with the kind of smooth precision operation that requires less maintenance for longer machine life — power requirements are less for MULTIROL bearing equipped machinery. SE Series construction is simplified . . . no loose or welded in roller retaining washers . . . lubrication reservoir built in. Smaller radial bearing space with increased load capacity permits more compact and less expensive housing facilities. All add up to improved anti-friction performance. Use with or without inner race in shaft sizes from ⅜" to 9¼". Write for data now!

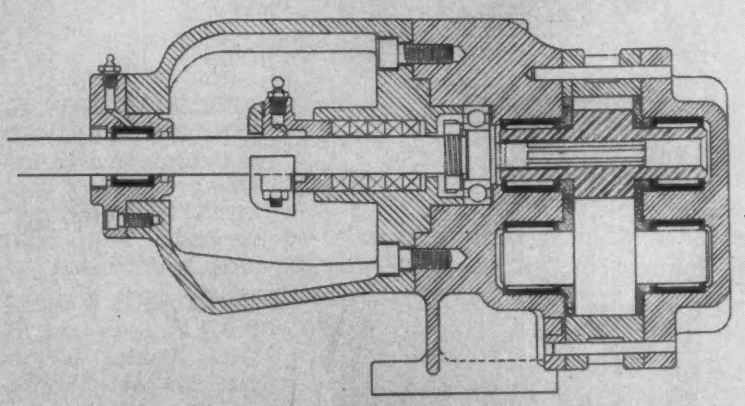




In typical capstan application MULTIROL SE Series maximum capacity bearings fit the small space under the cable drum, yet accept large diameter shaft necessary to carry heavy overhung load.



Use MULTIROL SE Series bearings on sheaves for maximum shaft diameter of pin and minimum housing OD . . . increases load capacity. Lubrication with Alemite fittings need less care than oil bath with plain bearings.



On a rotary gear pump, the heavier load capacity and comparatively small OD of SE Series MULTIROL Bearings permits use of larger shaft that resists deflection. Precision anti-friction requires less power imput.

Interested in SE Series MULTIROL bearing advantages? Write today for your copy of Bulletin SE-48. McGill Manufacturing Co., Inc. 400 N. Campbell St., Valparaiso, Indiana

McGILL
TRADE MARK
precision bearings

ture insulation in slab form. Heating elements form the top, bottom and sides of the chamber. Elements consist of nickel-chromium wire, imbedded in rectangular ceramic slabs. Furnaces operate directly from an alternating current power line, without the use of transformers.

Check No. 10 on Reply Card for more Details

Vending Pump Motor

An explosion-proof, single-phase, type KC, capacitor-start fractional-horsepower motor, is announced by General Electric Co.'s Fractional Horsepower Motor Division, Schenectady 5, N. Y. Designed for horizontal mounting, the motor is available in ratings of ½-hp, 1725 rpm, 60 cycles, and ⅓-hp, 1425 rpm, 25 and 50 cycles, 115/230 v ac. It is suitable for use in class 1, group D hazardous locations.

High starting torque of the motor makes possible quick pump start. Features such as an automatic reset overload protective device, voltage selector switch and on-off line switch assure safe operation and ease of assembly to pump. A swivel conduit connector, with close fitting threads, protects the lead outlet and is adjustable for convenience in fitting the conduit. Oil saturated wool packing requires servicing with only 30 to 70 drops of oil at the end of each 1000 hours of normal operation.

Check No. 11 on Reply Card for more Details

Tractor Crane

Mounted on a model UTI, Minneapolis-Moline tractor, the Handi-Crane, made by Clyde Iron Works Inc., Duluth 1, Minn., has a high lifting capacity of 4 tons. Its easy steering is due to a special steering gear with roller-bearing knuckles. It revolves 320 degrees so that loads can be picked up, carried or spotted on either side.

An all-steel welded boom is raised and lowered by means of a hydraulic cylinder which permits independent boom topping at all times. Hydraulic cylinder and boom are mounted on a turntable that rides between two rows of large diameter steel balls. Operator's seat is offset to provide full visibility and all controls are grouped within convenient reach. The crane has a turning radius of 17 feet 6 inches.

Check No. 12 on Reply Card for more Details

Straddle Truck

Although not larger in size, the improved model M straddle truck made by Hyster Co., Portland 8, Ore., is now capable of carrying 18,000 pounds instead of the previous 12,000 pounds. Capacity is increased because of a revised main frame structure and new hoist clutch arrangement. Greater visibility from the driver's seat is attained by use of a forward sloping hood. A spring suspension system assures better riding and steering and gives more traction for the driving wheel.

Truck operates on pneumatic tires and has four-wheel hydraulic brakes. It is powered by a 6 cylinder 82 hp engine and has four speeds forward and back. It may be geared for maximum speeds of from 30 to 45 mph,

Install Them and Forget Them!
AMERICAN
RADIAL
Roller Bearings
AMERICAN RADIAL ROLLER BEARINGS are engineered to exacting standards that result in better performance and minimum maintenance.
Furnished in 5 styles, 6 S.A.E. series and 85 sizes. Special designs also available. Write.
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ROLLER BEARING CO.
420 Melwood Street Pittsburgh, Pa.
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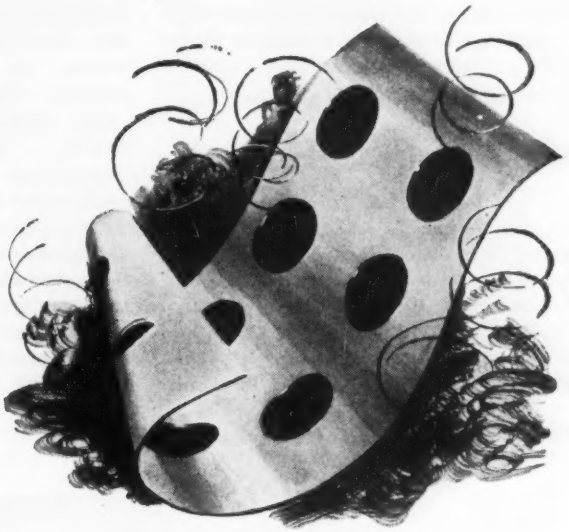
Steel Scrap

IS NOT JUST THIS—



It's also your "Warren Harding era" machinery, beat-up equipment, tired and dog-eared tools and parts, used-up odds and ends, and rejects.

And all of this heavy scrap is needed to increase the supply of steel mill melting stock . . . that we need to fill industry's demands and create an emergency reserve for national security.

It's needed because our scrapyards aren't getting the old-model cars they used to (people are still driving them) . . . precious little of the war-time steel production ever came back as scrap . . . and the supply of war scrap overseas has been held up by the winter weather.

Heavy scrap—exactly the type you have—can help to increase production (heavy scrap processes faster than light scrap) and *provide an emergency reserve.*

So—whether you've realized it or not—

YOU'RE IN THE SCRAP BUSINESS NOW

Clean out the corners of your plant and help fill the supply line.

More heavy scrap turned in means more steel production for domestic needs—and a safe backlog for emergency.

Our goal is one million additional tons of heavy scrap.

So start a Steel Scrap Salvage Drive *now.* Appoint one official in your plant as your Heavy Scrap Drive Director . . . and give him authority to sell unneeded inventory. Consult your scrap dealer.

Do this now—help speed the day when we can consider our production *sufficient* and our emergency reserve *safe.*

Set up a steel scrap salvage program in your plant — NOW

STEEL

according to requirements. Turning radius on level ground without load is 12¼ feet.

Check No. 13 on Reply Card for more Details

Flexible Shaft Machines

Instant changing from one speed to another is a feature of the 4-speed Strandflex flexible shaft machines made by N. A. Strand & Co., Chicago 40, Ill. By means of an eccentric driving sleeve assembly, one or more master gears may be engaged by a slight rotary and axial movement of the sleeve for the several different speeds. Driving unit consists of a totally enclosed ball bearing electric motor, grit-proof switch and enclosed gear drive assembly.

Machines are built in six bench types, four floor types and four vertical types for overhead suspension. Units have ¼, ⅓ and ½-hp motors. Such operations as grinding, buffing, sanding, drilling, rotary filing, screw driving, nut setting and rasping may be performed. Right angle attachments and wheels, chucks, sanding drums, wire brushes, etc., are available.

Check No. 14 on Reply Card for more Details

Air Backstand

Designed for heavy production grinding or polishing with abrasive belts, the model 3-A air backstand made by Hammond Machinery Builders Inc., Kalamazoo 54F, Mich., has an air-actuated cylinder which automatically maintains correct belt tension, compensating immediately for a fraction of an inch belt stretch. It has been found that different pieces of material require different

belt tension. After correct tension is determined, the operator sets the pressure regulator valve.

Backstand is of heavy cast iron construction except for a stainless steel 12-inch diameter, 7-inch face idler pulley. This pulley is diametrically balanced and runs on sealed ball bearings.

Check No. 15 on Reply Card for more Details

Distribution Cutout

Eight thousand amperes at 2500 or 5000 amp at 5 kv is within the interrupting capacity of the type HC high capacity cutout announced by Westinghouse Electric Corp., Pittsburgh 30, Pa. It is rated at 5 kv, 50 amp and will take any standard universal-type fuse link up to its capacity. It is applicable for use on 2400 v delta, 4160 Y, 4800 v delta, and 8300 v grounded Y systems.

Cutout can be installed in locations where high capacities are required. It consists of the porcelain box used in the current EA standard interrupting capacity design and a new, high-strength, high-capacity door

which can be purchased separately and used as a direct replacement for existing doors of standard EA cutouts. Substitution of doors requires no changes in present cutout box or wiring. Both dropout or nondropout doors are offered.

Check No. 16 on Reply Card for more Details

Jig Saw

Four speeds of 570, 858, 1220 and 1658 rpm permit the 24-inch ball bearing jig saw, made by Atlas Press Co., 2395 N. Pitcher St., Kalamazoo, Mich., to cut practically all types of

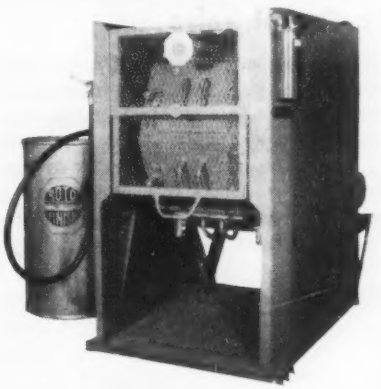
materials. Machine has a heavy base overarm and table, plus a precision drive that keeps vibration to minimum for smooth cutting. The 14 x 14-inch ground iron table is supported by large trunnions spaced 9¾-inches apart.

Easily adjustable chucks take all types of blades and sabres up to 5/16-inch wide and machine files up to ¼-inch wide. A ground steel shaft spins on SKF ball bearings. Operating shafts are supported by long Oilite bronze bearings. Table tilts 45 degrees to the right, 15 degrees to the left besides indexing 90 degrees to handle long stock. Overarm is easily removable for cutting long panels. Maximum depth of cut is 2¼-inches and blades of 6 inches or less may be used. Operation is from ⅓ or ½-hp, 1725 rpm motor.

Check No. 17 on Reply Card for more Details

Roto-Finish Machine

Parts, size and shape not adapted to standard Roto-Finish processing methods may be finished in a new eight-door machine, announced by Sturgis Products Co., Sturgis, Mich. Built as special equipment for individual requirements, the machine is similar to the standard one compartment machine, except that each flat of the octagon cylinder is fitted with a large size door. Parts are rigidly fixtured to the back of each door so that surfaces to be finished are presented to the processing mass. Selective action caused by one-direc-



tion processing is overcome by reversing cylinder rotation.

All regular Roto-Finish processes and materials can be used with the machine. Extra cam locks are fitted to each door to overcome added strain imposed by fixtures on the doors. Fixture plates and doors are interchangeable to handle a multiple of different parts, all of which may be processed at one time. Doors may be lined or unlined. Due to a variety of requirements, motor size varies with each application. Supplied with each machine is a magnetic brake and

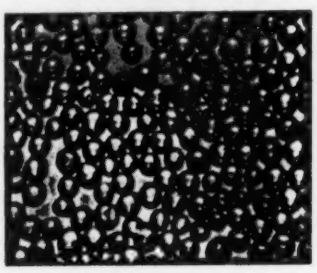
ACCEPTED
BY AMERICA'S LARGEST INDUSTRIAL PLANTS TO DO THE TOUGHEST BLASTING AND PEENING OPERATIONS

HI-GRADE METALLIC

FAMOUS
FOR ITS ABILITY TO STAND UP UNDER REPEATED HARD USE

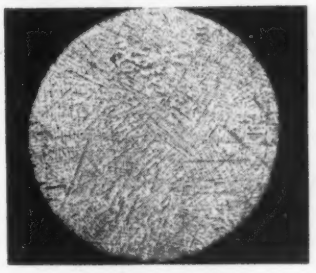
SHOT
- ROUND
- UNIFORM IN SIZE
- UNIFORM IN HARDNESS
- LACKS IRREGULAR SHAPES

GRIT
- RECTANGULAR
- SHARP
- TOUGH
- DURABLE



UNRETOUCHED PHOTO OF HI-GRADE SHOT

CLAYTON-SHERMAN ABRASIVES COMPANY
3896 LONYO ROAD
DETROIT 10, MICHIGAN
CEdar 7200



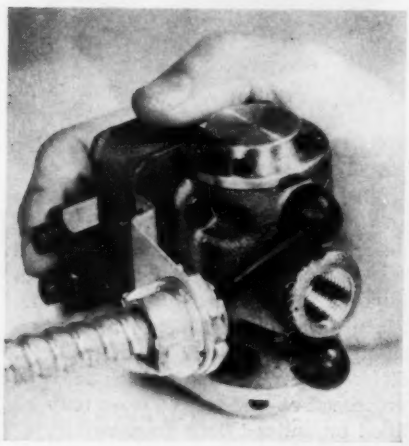
MICROSCOPIC STRUCTURE OF METAL

a forward and reversing switch. Automatic timer controls are optional.

Check No. 18 on Reply Card for more Details

Air Control Valve

Operating at a speed of over 2200 movements per minute, a new solenoid-actuated air control valve, announced by Bellows Co., Akron, O., uses the air it controls to operate the valve. It consists of a cast bronze body incorporating a single air inlet, suitable electric ter-



minals and a cylinder in which floats a light weight piston. This piston engages and shifts a four-way shear-flow air valve. Caps enclosing each end of the cylinder hold small 8 v solenoids.

Valve will operate on 5 to 150 pounds air line pressure. Despite the high rate of speed maintained hour after hour, the heat generated is hardly noticeable. The valve is compact and completely enclosed and will operate submerged or covered with coolant, chips or dust. Water or oil in the air line will not affect its operation. Valve is offered within ¼ and ⅜-inch port sizes and comes complete with a special transformer.

Check No. 19 on Reply Card for more Details

• • •

START-STOP CONTROL: An automatic start-stop control for electric driven direct current welders enables operator to start welder instantly by striking an arc. Control shuts off welder after 2 minutes (adjustable) of no-welding. Control is manufactured by DV Welding Controls, Oakland 11, Calif.

Check No. 20 on Reply Card for more Details

GAS VALVE: B-50 electric diaphragm gas valve, offered by General Controls Co., Glendale 1, Calif., is designed for reliable control of natural, manufactured, mixed and liquefied petroleum gases to space and unit heaters, central, floor and wall furnaces and boilers. It is available in seven sizes.

Check No. 21 on Reply Card for more Details

PYROMETER: Developed by Pyramid Instrument Co., New York 13, N. Y., the Flexmount pyrometer features a swivel mount. By adjustment of one set screw, meter case can be moved in a horizontal arc from 0 to 180 degrees.

Check No. 22 on Reply Card for more Details

PIPE THREADER: Armstrong Bros. Tool Co., Chicago 30, Ill., offers No. 165 portable power pipe threader. It is operated by any ½-inch standard electric drill. It threads 1, 1¼, 1½ or 2-inch pipe with one set of high speed steel chasers.

Check No. 23 on Reply Card for more Details

CLEANING, COATING COMPOUND: A new cleaning and phosphate coating material for use on steel and other ferrous metals to provide a base for paint coating is offered by Detrex Corp., Detroit 32, Mich. Known as Detrex 79, it is a yellow, noncorrosive cleaning compound in dust-free powder form.

Check No. 24 on Reply Card for more Details

ELECTRODE: Hy-Lo electrode AWS E7015 for the welding of high sulphur, high carbon, low alloy high strength and hardenable steels is announced by Champion Rivet Co., Cleveland 5, O. Can also be used to weld parts that are to be galvanized or porcelain enameled, steel of doubtful analysis, manganese or spring steel to mild steel, locomotive frames and flexible staybolt sleeves.

Check No. 25 on Reply Card for more Details

WINDOW FAN: Portable, direct drive, three-speed window fans equipped with extension cord and three-speed switches, are offered by Chelsea Fan & Blower Co. Inc., Irvington, N. J. Available in 16 or 20-inch size, fan fits window openings from 25 to 36 inches.

Check No. 26 on Reply Card for more Details

WIRE MARKER: Flag-It Wire Marker Co., Los Angeles, Calif., introduces a self-adhesive wire marker for production line manufacture of electrical units and wiring. Designed for wire with an outside dimension of 0.20-inch, markers measure ⅞-inch long and ⅜-inch wide.

Check No. 27 on Reply Card for more Details

METAL CLEANERS: Klem Chemicals Inc., Dearborn, Mich., announces two new metal cleaners, Rust-Sol No. 123 for wash-off or immersion type of cleaning and Rust-Sol No. 113 for wipe-off or hand application. Both cleaners emulsify all oil and grease and penetrate the oil coating to the steel surface where they dissolve all rust and oxide with a reaction that leaves a protective iron phosphate coating.

Check No. 28 on Reply Card for more Details

DIP COMPOUND: United Chromium Inc., New York 17, N. Y., announces the development of Unichrome dip compound 95, which is used to produce corrosion-resisting conversion coatings on hot dipped zinc, plated zinc and zinc die castings.

Check No. 29 on Reply Card for more Details

REPEATER BRUSH: A wire brush for whisking away loosened slag, oxides and rust from welded parts has been incorporated into the handle of the Multi-Pic weld cleaning tool made by Bernard Welding Equipment Co., Chicago 19, Ill.

Check No. 30 on Reply Card for more Details

PARALLEL UNITS: To eliminate makeshift methods of supporting tools, dies, jigs, etc., for various operations such as drilling, counterboring, tapping, milling and grinding, Acro Die & Stamping Co., Chicago 25, Ill., offers a patented safety parallel unit. It is available in 3, 5 and 7-inch heights and 20-inch spread.

Check No. 31 on Reply Card for more Details

WIRE MESH MEMBRANE: Titeflex Inc., Newark 5, N. J., has developed a wire mesh membrane which can be used in any of the company's standard filters. It is a cylinder constructed of type 316 stainless steel Dutch weave wire cloth and supported on the inside by a 1/16-inch thick perforated cylinder with a ring on each end to act as a bearing surface.

Check No. 32 on Reply Card for more Details

ELECTRO CLEANER: An electro cleaner for zinc base die castings is announced by Diversey Corp., Chicago, Ill. Designated as No. 505, it also tends to condition surface of zinc making possible better adhesion between it and the electro plate.

Check No. 33 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

STEEL producers are intensifying efforts to book tonnage with demand continuing to decline. More premium prices have been adjusted downward and consumer pressure on standard mill quotations is mounting in step with the slump in buying and the collapse in the scrap market. Steel salesmen again are beating the bushes for business with the mills reaching out to points distant from producing plants for orders and manifesting greater interest in forward commitments, beyond the present quarter in some instances. So noticeable is the current downtrend in demand some trade authorities now are predicting a drop in ingot operations to 90 per cent or lower by early May, and these predictions are finding a degree of support in reported projected cutbacks in blast furnace operations with producers beginning to stockpile merchant pig iron.

SUPPLY— General loosening in supplies is noted all along the line, even extending to such tight-supply products as galvanized sheets and reinforcing steel. Predictions now are being freely made in the trade that demand-supply balance will be attained in many major products before end of second quarter. Such balance already has been struck in alloys and specialties, and merchant pig iron is rapidly attaining surplus status. Diversion of some blast furnace capacity from merchant iron to steelmaking iron is reported under consideration. Evidence is accumulating that the mills' consumer quota system of distribution is on the way out. Many customers are not taking full quotas and resale offerings are appearing frequently. Some tonnage rejections are reported and mill over-runs are increasingly difficult to dispose of.

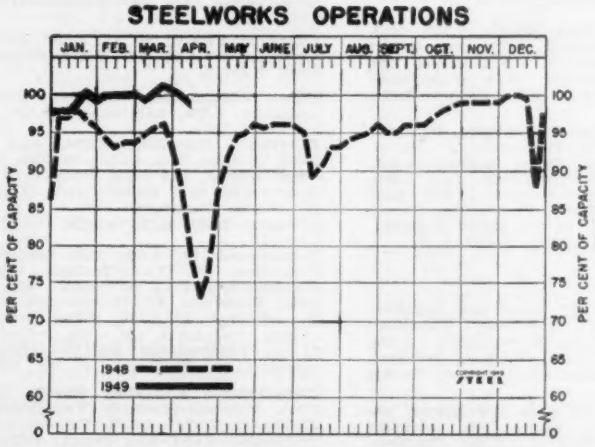
PRICES—Further downward adjustments have been effected in premium prices. Products affected this past week included billets, standard rails, plates, low-alloy high tensile sheets and hot-rolled sheets. In some instances the reductions in prices have been particularly sharp, on plates as much as $8 per ton, for instance. It is noteworthy however, that despite the cut in premium quotations standard mill schedules still are holding firmly. Except for certain zinc-coated products which are undergoing substantial reductions to reflect last week's cut of 1.00 cent per lb in the price of zinc in accordance with the mills' standard formula by which prices are adjusted automatically whenever there is a change in zinc, no downward revision or waiving of standard mill extras has yet appeared. It is believed such would likely precede any broad adjustment in base prices and, consequently, these are being watched closely for a tip-off as to the future trend.

SCRAP— Present disturbed state of the scrap iron and steel market is without precedent. Prices have declined nearly 50 per cent in the past three months in the face of capacity steel mill operations. The drop in the past several weeks has been especially sharp. Currently, heavy melting steel is being offered at prices close to OPA levels and in some remote areas is available below the controlled price levels of wartime. Despite this sharp price cutback the steel mills continue disinterested in offerings and there is no sign as yet of any substantial buying in the offing.

PRICE COMPOSITES— Price tone of the markets is noticeably weaker. STEEL's price composite on finished steel last week declined to $94.91 from $96.68 the preceding week and compared with $81.14 for the like week a year ago; on semifinished steel to $69.02 from $70.14 and compared with $68.72 a year ago; on steelmaking scrap to $25.50 from $30.33 and compared with $40.42 for the like week a year ago. The composite price for steelmaking pig iron held unchanged last week at $46.22 and compared with $39.18 for the like week a year ago.

PRODUCTION—Steelmaking operations continued to decline last week, the estimated national ingot rate falling 1½ points to 98.5 per cent of capacity.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended April 9	Change	Same Week 1948	Same Week 1947
Pittsburgh	97	— 1.5*	86	97.5
Chicago	98	— 3*	93	95.5
Eastern Pa.	94.5	None	65	90.5
Youngstown	105	+ 4	60	86
Wheeling	95.5	— 1	87	93.5
Cleveland	101.5	— 1.5	95.5	96
Buffalo	104	None	54	88.5
Birmingham	100	None	45	99
New England	88	None	80	94
Cincinnati	104	+ 1	96	92
St. Louis	77.5	— 5	89.5	87.5
Detroit	107	+ 3	104	93
Western	102	+ 2.5	..	..
Estimated national rate	98.5	— 1.5	78	96.5

Based on weekly steelmaking capacity of 1,843,516 net tons for 1949; 1,802,476 net tons for 1948; 1,749,928 tons for 1947. *Revised.

COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	Apr. 9	Apr. 2	Month Ago Mar. 1949	Year Ago Apr. 1948	5 Years Ago Apr. 1944
Finished Steel	$94.91	$96.68	$97.17	$81.14	$56.73
Semifinished Steel	69.02	70.14	73.51	68.72	36.00
Steelmaking Pig Iron	46.22	46.22	46.22	39.21	23.00
Steelmaking Scrap	25.50	30.33	34.60	40.41	19.17

FINISHED STEEL WEIGHTED COMPOSITE†

Mar. 1949	4.04073c
Feb. 1949	4.05394c
Jan. 1949	4.05394c
Mar. 1948	3.63079c
Mar. 1944	2.42750c

* **STRAIGHT ARITHMETICAL COMPOSITES:** Computed from average industry-wide mill prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (re-rolling billets and slabs, sheet bars, skelp, and wire rods, on Basic Pig Iron (at eight leading producing points), and on Steelworks Scrap (No. 1 melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Steel arithmetical composites, dollars per net ton; pig iron and scrap, gross ton.

† **FINISHED STEEL WEIGHTED COMPOSITE:** Computed in cents per pound, mill prices, weighted by actual monthly shipments of following products, representing about 82 per cent of steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates, standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip. February and March, 1949, figures are preliminary.

COMPARISON OF PRICES

Representative market figures for current week; average for last month, three months and one year ago. Finished material (except tin plate) and wire rods, cents per lb; semifinished (except wire rods) and coke, dollars per net ton, others dollars per gross ton. Delivered prices represent lowest from mills.

Finished Materials

	April 9, 1949	Mar. 1949	Jan. 1949	Apr. 1948
Steel bars, Pittsburgh mills	3.35c	3.43c	3.45c	2.90c
Steel bars, del. Philadelphia	3.8164	3.8164	3.8094	3.356
Steel bars, Chicago mills	3.35	3.35	3.35	2.90
Shapes, Pittsburgh mills	3.25	3.27	3.275	2.80
Shapes, Chicago mills	3.25	3.25	3.25	2.80
Shapes, del. Philadelphia	3.4918	3.4918	3.4888	2.968
Plates, Pittsburgh mills	3.50	3.50	3.50	2.95
Plates, Chicago mills	3.40	3.40	3.40	2.95
Plates, del. Philadelphia	3.7256	3.7256	3.7217	3.19
Sheets, hot-rolled, Pittsburgh mills	3.275	3.275	3.275	2.80
Sheets, cold-rolled, Pittsburgh	4.00	4.00	4.00	3.55
Sheets, No. 10 galv., Pittsburgh	4.40	4.40	4.40	3.95
Sheets, hot-rolled, Gary mills	3.25	3.25	3.25	2.80
Sheets, cold-rolled, Gary mills	4.00	4.00	4.00	3.55
Sheets, No. 10 galv., Gary mills	4.40	4.40	4.40	3.95
Strip, hot-rolled, Pittsburgh mills	3.50	3.50	3.50	3.05
Strip, cold-rolled, Pittsburgh mills	4.375	4.375	4.375	3.80
Bright basic, wire, Pittsburgh	4.15	4.255	4.325	3.775
Wire nails, Pittsburgh mills	5.20	5.545	5.775	5.20
Tin plate, per base box, Pitts. dist.	$7.75†	$7.75†	$7.75†	$6.80

Semifinished

Sheet bars, mill	$67.00*	$67.00*	$67.00*	$60.00
Slabs, Chicago	52.00	52.00	52.00	45.00
Rerolling billets, Pittsburgh	52.00	56.20	59.00	45.00
Wire rod ⅞ to ¼-inch, Pitts. dist.	3.775c	3.775c	3.775c	3.175c

* Nominal. † 1.50 lb coating.

Pig Iron

	April 9, 1949	Mar. 1949	Jan. 1949	Apr. 1948
Bessemer, del. Pittsburgh (N.&S. sides)	$48.08	$48.08	$48.08	$40.996
Basic, Valley	46.00	46.00	46.00	39.00
Basic, eastern, del. Philadelphia	50.3002	50.3002	50.2676	42.004
No. 2 fdry., del. Pgh. (N.&S. sides)	47.58	47.58	47.58	40.496
No. 2 fdry., del. Philadelphia	50.8002	50.8002	50.7676	42.504
No. 2 foundry, Chicago	46.25	46.25	46.25	39.00
No. 2 foundry, Valley	46.50	46.50	46.50	39.50
Southern No. 2 Birmingham	43.38	43.38	43.38	37.88
Southern No. 2 del. Cincinnati	49.43	49.43	49.09	41.857
Malleable, Valley	46.50	46.50	46.50	39.50
Malleable, Chicago	46.50	46.50	46.50	39.50
Charcoal, low phos., fob Lyles, Tenn.	66.00	66.00	66.00	55.00
Ferromanganese, f.o.b. Etna, Pa.	175.00	170.20	163.00	151.00*

* F.o.b. cars Pittsburgh.

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$26.50	$37.00	$41.90	$40.25
Heavy melt. steel, No. 2, E. Pa.	21.50	30.70	40.00	39.00
Heavy melt. steel, No. 1, Chicago	25.50	33.30	40.00	39.00
Heavy melt. steel, No. 1, Valley	24.00	35.85	39.75	40.25
Heavy melt. steel, No. 1, Cleveland	22.00	34.10	45.88	39.75
Heavy melt. steel, No. 1, Buffalo	25.75	35.95	45.88	43.00
Rails for rerolling, Chicago	34.00	43.85	59.38	49.50
No. 1 cast, Chicago	34.50	39.20	58.38	68.40

Coke

Connellsville, beehive furnace	$14.50	$14.50	$14.50	$12.55
Connellsville, beehive foundry	17.00	17.00	17.00	14.875
Chicago, oven foundry, ovens	20.40	20.40	20.40	19.25

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per net ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $80-$85 per gross ton. Forging quality, $50 per net ton, mill.

Alloy Steel Ingots: $51 per net ton, mill.

Rerolling Billets, Blooms, Slabs: $52 per net ton, mill, except: $57, Conshohocken, Pa.

Forging Quality Billets, Blooms, Slabs: $61 per net ton, mill, except: $68, Conshohocken, Pa., mill.

Alloy Billets, Slabs, Blooms: Rerolling quality, $63 per net ton, mill except: $65, Consohocken, Pa.

Sheet Bars: $67 nom., per net ton, mill; sales in open market $90 per gross ton.

Skelp: 3.25c per lb, mill.

Tube Rounds: $76 per net ton, mill; some sellers quoting up to $120 per gross ton.

Wire Rods: Basic and acid open-hearth, 7/32 & ⅜-inch, inclusive, 3.40c per lb, mill, except: 3.65c, Struthers, O.; 3.70c, Worcester, Mass.; 4.05c, Pittsburg, Calif.; 4.10c, Portsmouth, O., Los Angeles; 4.15c Monessen, Pa. Basic open-hearth and bessemer, not resulphurized, 7/32 to 47/64-inch, inclusive, 3.50c, mill.

Bars

Hot-Rolled Carbon Bars (O.H. only; base 20 tons): 3.35c, mill, except: 3.55c, Ecorse, Mich.; 4.00c Fontana, Calif.; 4.05c, Pittsburg, Torrance, Calif.; 4.10c, S. San Francisco, Los Angeles, Niles, Calif.; Portland, Oreg., Seattle; 4.20c, Kansas City, Mo.; 4.25c, Minnequa, Colo.; 4.40c, Atlanta.

Rail Steel Bars: (Base 10 tons): 3.35c Huntington, W. Va., and Moline, Ill.; 4.75c, Williamsport, Pa.

Hot-Rolled Alloy Bars: 3.75c, mill, except: 4.05c, Ecorse, Mich.; 4.80c, Los Angeles; 4.75c, Fontana, Calif.

Cold-Finished Carbon Bars (Base 40,000 lb and over): 4.00c, mill, except: 3.95c, Pittsburgh, Cumberland, Md.; 4.20c, Indianapolis; 4.30c, Ecorse, Mich.; 4.35c, St. Louis; 4.36c, Plymouth, Mich.; 4.40c, Newark, N. J., Hartford, Putnam, Conn., Mansfield, Readville, Mass.; 4.50c, Camden, N. J.; 5.30c, Los Angeles.

Cold-Finished Alloy Bars: 4.65c, mill, except: 4.85c, Indianapolis; 4.95c, Worcester, Mansfield, Mass., Hartford, Conn.

High-Strength, Low-Alloy Bars: 5.10c, mill, except: 5.30c, Struthers, O.; 5.40c, Ecorse, Mich.

Reinforcing Bars (New Billet): 3.35c, mill, except: 4.05c, Pittsburg, Torrance, Calif.; 4.10c, Atlanta, Seattle, S. San Francisco, Los Angeles; 4.25c, Minnequa, Colo. Fabricated: To consumers: 4.25c, mill, except: 5.00c, Seattle.

Reinforcing Bars (Rail Steel): 4.65c, Williamsport, Pa., mill; 3.35c, Huntington, W. Va.

Wrought Iron Bars: Single Refined: 8.60c, (hand puddled), McKees Rocks, Pa.; 9.50c, Economy, Pa. Double Refined: 11.25c (hand puddled), McKees Rocks, Pa.; 11.00c, Economy, Pa. Staybolt: 12.75c, (hand puddled), McKees Rocks, Pa.; 11.30c, Economy, Pa.

Sheets

Hot-Rolled Sheets (18 gage and heavier): 3.25c, mill, except: 3.25-3.30c, Cleveland; 3.30c, Pittsburgh; 3.45c, Ecorse, Mich.; 3.75c, Conshohocken, Pa.; 3.95c, Pittsburg, Torrance, Calif.; 4.15c, Fontana, Calif.; 6.25c, Kansas City, Mo.

Hot-Rolled Sheets (19 gage and lighter, annealed): 4.15c, mill, except: 4.40c, Alabama City, Ala.; 4.65c, Niles, O.; 5.05c, Torrance, Calif., Kokomo, Ind.

Cold-Rolled Sheets: 4.00c, mill, except: 4.20c, Ecorse, Mich., Granite City, Ill.; 4.95c, Pittsburg, Calif.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) 4.40c, mill, except: 5.00c, Niles, O.; 5.15c, Pittsburg, Torrance, Calif.; 5.30c, Kokomo, Ind.

Galvannealed Sheets: 4.95c, mill, except: 5.05c, Indiana Harbor, Ind.; 5.55c, Niles, O.; 5.70c, Kokomo, Ind.

Culvert Sheets, No. 16 flat Copper Steel (based on 5-cent zinc): 5.00c, mill, except: 5.40c, Granite City, Ill.; 5.45c, Kokomo, Ind.; 5.75c, Pittsburg, Torrance, Calif.

Long Ternes, No. 10 (Commercial quality): 4.80c, mill.

Enameling Sheets, No. 12: 4.40c, mill, except: 4.60c, Granite City, Ill.; 4.70c, Ecorse, Mich.; 6.00c, Niles, O.

Silicon Sheets, No. 24: Field: 5.15c, mill. **Armature:** 5.45c, mill, except: 5.95c, Warren, O.; 6.05c, Niles, O. **Electrical: Hot-rolled,** 5.95c, mill, except: 6.05c, Kokomo, Ind.; 6.15c, Granite City, Ill.; 6.45c, Warren, O.; 6.55c, Niles, O. **Motor:** 6.70c mill, except: 6.90c, Granite City, Ill.; 7.20c, Warren, O. **Dynamo:** 7.50c, mill, except: 7.70c, Granite City, Ill. **Transformer 72,** 8.05c, mill, except: 9.15c, Follansbee, W. Va., Toronto, O.; 10.05c, Brackenridge, Pa.; **65,** 8.60c, mill, except: 9.85c, Follansbee, W. Va., Toronto, O.; 10.60c, Brackenridge, Pa.; **58,** 9.30c, mill, except: 10.55c, Follansbee, W. Va., Toronto, O.; 11.30c, Brackenridge, Pa.; **52,** 10.10c, mill, except: 11.35c, Follansbee, W. Va., Toronto, O.

High-Strength Low-Alloy Sheets: Hot-rolled, 4.95c, mill, except: 5.15c, Youngstown; 5.25c, Ecorse, Mich. Galvanized (No. 10), 6.75c, mill. Cold-rolled, 6.05c, mill, except: 6.25c, Youngstown; 6.35c, Ecorse, Mich.

Strip

Hot-Rolled Strip: 3.25c mill, except: 3.30c, Cleveland, Pittsburgh, Riverdale, Ill.; 3.25-3.35c,* Sharon, Pa.; 3.45c, Ecorse, Mich.; 3.60c, Detroit; 3.65c, Atlanta; 3.70c, West Leechburg, Pa.; 4.00c, Pittsburg, Torrance, Calif.; 4.25c, Seattle, S. San Francisco, Los Angeles; 4.20c, Kansas City, Mo.; 4.30c, Minnequa, Colo.; 4.65c, Fontana, Calif. One company quotes 4.90c, Pittsburgh base.

* Wider than 6-in. and 6-in. and narrower, respectively.

Cold-Rolled Strip (0.25 carbon and less); 4.00c, mill, except 4.00-4.25c, Warren, O.; 4.00-4.50c, Youngstown; 4.20c, Ecorse, Mich.; 4.25c, Riverdale, Ill.; 4.40-4.50c, Detroit; 4.50c, New Haven, Conn., West Leechburg, New Castle, Pa., Boston; 4.75c, Dover, O., New Kensington, Pa.; 4.50-5.00c, Trenton, N. J.; 4.80-5.05c, Wallingford, Conn.; 5.75c, Los Angeles; 5.55c, Fontana, Calif. One company quotes 4.55c, Cleveland or Pittsburgh base, and 4.75c, Worcester, Mass., base; another, 5.00c, Pittsburgh base.

Cold-Finished Spring Steel: 0.26-0.40 C, 4.00c, mill, except: 4.25c, Dover, O., Chicago; 4.30c, Worcester, Mass.; 4.50c, New Castle, Pa., Boston, Youngstown; 4.75c, Wallingford, Conn. Over 0.40 to 0.60 C, 5.50c, mill, except: 5.65c, Chicago; 5.75c, Dover, O.; 5.80c, Worcester, Mass., Wallingford, Conn., Trenton, N. J.; 5.95c, Boston; 6.00c, New Castle, Pa. Over 0.60 to 0.80 C, 6.10c, mill, except: 6.25c, Chicago; 6.35c, Dover, O.; 6.40c, Worcester, Mass., Wallingford, Bristol, Conn., Trenton, N. J.; 6.60c, New Castle, Pa. Over 0.80 to 1.05 C, 8.05c, mill, except: 7.85c, Dover, O.; 8.20c, Chicago; 8.35c, Worcester, Mass., Bristol, Conn., Trenton and Harrison, N. J. Over 1.05 to 1.35 C, 10.35c, mill, except: 10.15c, Dover, O.; 10.30c, Wallingford, Conn.; 10.50c, Chicago; 10.65c, Worcester, Mass., Trenton and Harrison, N. J.

Cold-Rolled Alloy Strip: 9.50c, mill except: 9.80c, Worcester, Mass.

High-Strength, Low-Alloy Strip: Hot-rolled, 4.95c, mill, except: 5.15c, Struthers, O.; 5.25c, Ecorse, Mich., mill. Cold-rolled, 6.05c, mill, except: 6.25c, Youngstown; 6.35c, Ecorse, Mich., mill.

Tin, Terne Plate

Tin Plate: American Coke, per base box of 100 lb, 1.25 lb coating $7.50-$7.70; 1.50 lb coating $7.75-$7.95. Pittsburg, Calif., mill $8.25 and $8.50, respectively, for 1.25 and 1.50 lb coatings.

Electrolytic Tin Plate: Per base box of 100 lb, 0.25 lb tin, $6.45-$6.65; 0.50 lb tin, $6.70-$6.90; 0.75 lb tin, $7.00-$7.20.

Can Making Black Plate: Per base box of 100 lb, 55 to 128 lb basis weight $5.75-$5.85. Pittsburg, Calif., mill, $6.50.

Holloware Enameling Black Plate: 29-gage, 5.30c per pound, except: 5.40c, Sparrows Point. Md.; 5.50c, Granite City, Ill.

Manufacturing Ternes (Special Coated): Per base box of 100 lb, $6.65, except: $6.75 Fairfield, Ala., Sparrows Point, Md.

Roofing Ternes: Per package 112 sheets; 20 x 28 in., coating I.C. 8-lb, $15.50.

Plates

Carbon Steel Plates: 3.40c, mill, except: 3.40-3.60c, Cleveland; 3.45c, Sparrows Point, Md., Johnstown, Pa., Lackawanna, N. Y.; 3.55c, Conshohocken, Pa.; 3.60c, Pittsburgh; 3.65c, Claymont, Del., Ecorse, Mich.; 3.75c, Coatesville, Pa.; 4.30c, Seattle, Minnequa, Colo.; 4.56c, Houston; 5.30c, Fontana, Calif.; 4.95c, Harrisburg, Pa.; 6.25c, Kansas City, Mo.

Floor Plates: 4.55c, mill.

Open-Hearth Alloy Plates: 4.40c, mill, except: 5.10c, Coatesville, Pa., mill.

High-Strength, Low-Alloy Plates: 5.20c mill, except: 5.10c, Coatesville, Pa.; 5.30c, Conshohocken, Pa., Sparrows Point, Md., Johnstown, Pa.; 5.40c, Youngstown; 5.65c, Ecorse, Mich., Sharon, Pa.

Shapes

Structural Shapes: 3.25c, mill, except: 3.30c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.; 3.75c, Phoenixville, Pa.; 3.85c, Torrance, Calif.; 4.15c, Minnequa, Colo.; 4.30c, Seattle, S. San Francisco, Los Angeles; 3.80c, Fontana, Calif.

Alloy Structural Shapes: 4.05c, mill.

Steel Sheet Piling: 4.05c, mill.

High-Strength, Low-Alloy Shapes: 4.95c, mill, except: 5.05c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.; 5.15c, Struthers, O.

Wire and Wire Products

Wire to Manufacturers (carloads): Bright, Basic or Bessemer Wire, 4.15c, mill, except: 4.25c, Sparrows Point, Md., Kokomo, Ind.; 4.45c, Worcester, Mass.; 4.50c, Minnequa, Colo., Atlanta, Buffalo; 4.80c, Palmer, Mass.; 5.10c, Pittsburg, Calif.; 5.15c, S. San Francisco. One producer quotes 4.15c, Chicago base; another, 4.50c, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Basic MB Spring Wire, 5.55c, mill, except: 5.65c, Sparrows Point, Md.; 5.85c, Worcester, Palmer, Mass., Trenton, N. J.; 6.50c, Pittsburg, Calif.

Upholstery Spring Wire, 5.20c mill, except: 5.30c, Sparrows Point, Md., Williamsport, Pa., Portsmouth, O.; 5.50c, Worcester, Mass., Trenton, N. J., New Haven, Conn.; 6.15c, Pittsburg, Calif.

Wire Products to Trade (carloads): Merchant Quality Wire: Annealed (6 to 8 Gage base), 4.80c, mill, except: 4.90c, Sparrows Point, Md., Kokomo, Ind., Portsmouth, O.; 5.10c Worcester, Mass.; 5.15c, Minnequa, Colo.; 5.20c, Atlanta; 5.75c, S. San Francisco, Pittsburg, Calif. One producer quotes 4.80c, Chicago and Pittsburgh base; another, 5.20c. Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Galvanized (6 to 8 Gage base), 5.25c, mill, except: 5.35c, Sparrows Point, Md., Kokomo, Ind., Portsmouth, O.; 5.40c, Aliquippa; 5.55c, Worcester, Mass.; 5.60c, Minnequa, Colo.; 5.65c, Atlanta; 6.20c, Pittsburg, S. San Francisco, Calif. One producer quotes 5.25c, Pittsburgh and Chicago base; another, 5.65c, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Nails and Staples: Standard, cement-coated and galvanized nails and polished and galvanized staples, Col. 103, mill, except: 105, Sparrows Point, Md., Kokomo, Ind., Portsmouth, O.; 109, Worcester, Mass.; 110, Minnequa, Colo., Atlanta, Cleveland; 123, Pittsburg, Calif. One producer quotes Col. 103, Chicago and Pittsburgh base; another, Col. 113, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Woven Fence (9 to 15½ Gage, inclusive): Col. 109, mill, except: 111, Portsmouth, O., Kokomo, Ind.; 116, Minnequa, Colo.; 121, Atlanta; 132, Pittsburg, Calif. One producer quotes Col. 109, Pittsburgh and Chicago base; another, Col. 114, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Barbed Wire: Col. 123 mill, except: 125, Sparrows Point, Md., Kokomo, Ind., Portsmouth, O.; 126 Atlanta; 130, Minnequa, Colo.; 143, Pittsburg, Calif.; 145, S. San Francisco. One producer quotes Col. 123, Chicago and Pittsburgh base.

Fence Posts (with clamps): Col. 114, Duluth; 115, Johnstown, Pa.; 116, Moline, Ill.; 122, Minnequa, Colo.; $123.50 per net ton, Williamsport, Pa.

Bale Ties (single loop): Col. 106, mill, except: 108, Sparrows Point, Md., Kokomo, Ind., Portsmouth, O.; 110, Atlanta; 113, Minnequa, Colo.; 130, S. San Francisco, Pittsburg, Calif. One producer quotes Col. 115, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Stainless Steels

(Mill prices, cents per pound)

CHROMIUM NICKEL STEELS

Type No.	Bars, Wire Shapes	Strip, Cold-Rolled	Sheets
301.....	28.50-28.75	30.50-32.00	37.50-40.75
302.....	28.50-28.75	33.00-33.75	37.50-40.75
303.....	31.00-31.50	36.50-39.75	39.50-43.00
304.....	30.00-31.25	35.00-35.75	39.50-43.00
316.....	46.00-48.00	55.00-57.25	53.00-57.25
321.....	34.00-34.75	44.50-45.75	45.50-49.00
347.....	38.50-39.75	48.50-50.25	50.00-54.00

STRAIGHT CHROMIUM STEELS

410.....	22.75-23.00	26.50-27.00	32.00-33.00
416.....	23.25-23.50	28.25-33.50	32.50-33.50
430.....	23.25-23.50	27.00-27.50	34.75-35.50
446.....	32.50-33.00	60.00-62.25	46.50-50.00

STAINLESS-CLAD STEELS

	Plates —Cladding—		Sheets —Cladding—	
	10%	20%	10%	20%
302.....	....	....	19.75	21.50
304.....	22.50	26.50	20.75	22.50
310.....	32.50	36.50	....	....
316.....	27.00	31.00	26.00	28.00
321.....	23.50	27.50	....	....
347.....	25.00	29.00	24.00	26.00
405.....	18.75	24.75	....	....
410.....	18.25	24.25	....	....
430.....	18.25	24.25	....	....

Tool Steels

Tool Steel: Cents per pound, producing plants; reg. carbon 19.00c; extra carbon 22.00c; special carbon 26.50c; oil-hardening 29.00c; high carbon-chromium 52.00c; chrome hot work, 29.00c.

W	Cr	V	Mo	Co	Base Per lb
18	4	1	...	...	90.50c
18	4	2	...	...	102.50c
18	4	3	...	...	114.50c
18	4	2	...	9	168.50c
1.5	4	1	8.5	...	65.00c
6.4	4.5	1.9	5	...	69.50c
6	4	3	6	...	88.00c

Tubular Goods

Standard Steel Pipe: Mill prices in carlots, threaded and coupled, to consumers about $200 a net ton. Discounts from base follow:

	Butt Weld			Butt Weld	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛.....	39½–	10–	1.....	46–	26½–
	41½	14		48½	29
¼.....	37½–	11–	1¼....	46½–	27–
	39½	15½		49	29½
⅜.....	34–	6–	1½....	47–	27½–
	36	10½		49½	30
½.....	40½–	19½–	2.....	47½–	28–
	43	23		50	30½
¾.....	43½–	23½–	2½, 3..	48–	28½–
	46	26		50½	31
			3½ & 4.	44½	24

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2....	39½	19	38½	16½	27–	6½–
					38½–	18½
2½..	42½–	22–	41½	19½	32½–	12–
	43½	23			41½	21½
3....	42½–	22–	41½	19½	35–	14½–
	43½	23			41½	21½
3½&4	42½–	22–	43½	21½	38½–	18–
	46½	26			43½	23½
5 & 6.	42½–	22–	43½	21½	38½–	18–
	44½	24			43½	23½
7....	....	....	....	....	43½	22

Line Steel Pipe: Mill prices in carlots to consumers about $200 a net ton.

	Butt Weld			Butt Weld	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛.....	40½	....	1¼....	46–	27½–
¼.....	38½	....		48	28½
⅜.....	35	....	1½....	46½–	28–
½.....	40–	20–		48½	29
	42	21	2.....	47–	28–
¾.....	43–	24–		49	29½
	45	25	2½ & 3	47½–	28½–
1.....	45½–	27–		49½	30
	47½	28	3½ & 4	43½	....

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2....	38½	18	37½	15½	26–	5½–
					37½	18
2½..	42½	22	40½	19½	31½–	11–
					40½	20½
3....	42½	22	40½	19½	34–	13½–
					40½	20½
3½-4.	41½–	21½–	42½	20½	37½–	17–
	45½	25			42½	22½
5 & 6.	41½–	21½	42½	20½	37½–	17–
	43½				42½	22½
8....	45½	....	44½	21½–	40½–	19–
				22	44½	23½
10...	45	....	44	21–	41½–	20–
				21½	44	23
12...	44	....	43	20	40½–	19–
					43	22

Standard Wrought Iron Pipe: Mill price in carlots, threaded and coupled, to consumers about $200 a net ton.

	Butt Weld			Lap Weld	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅜...	+59½	+95½	1¼..	+22	+53
½...	+20½	+52½	1½..	+15½	+45½
¾...	+10½	+41½	2....	+ 7½	+36½
1 and			2½-3½	+ 5	+32
1¼	+ 4½	+32½	4....	List	+26
1½..	— 1½	+29	4½-8	+ 2	+27½
2....	— 2	+28½	9-12.	+12	+37

Boiler Tubes: Net base c.l. prices, dollars per 100′, mill; minimum wall thickness, cut lengths 4 to 24″, inclusive.

O.D.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	.....	13.39-14.64	13.00	13.00
1¼	13	.....	15.87-17.34	13.21	15.39
1½	13	16.45	17.71-19.35	14.60	17.13
1¾	13	18.71	20.15-22.02	16.60	19.54
2	13	20.96	22.56-24.66	18.60	21.89
2¼	13	23.36	25.16-27.50	20.73	24.40
2¼	12	23.54-25.73	27.70-30.28	22.83	26.88
2½	12	25.79-28.19	30.33-33.15	25.02	29.41
2¾	12	27.33-29.87	32.14-35.13	26.51	31.18
3	12	28.68-31.35	33.76-36.90	27.82	32.74
3¼	11	33.39-36.50	39.29-42.95	32.39	38.11
3½	11	35.85-39.19	42.20-46.13	34.78	40.94
4	10	44.51-48.65	52.35-57.22	43.17	50.78
4½	9	58.99-64.47	69.42-75.88	....	....
5	9	68.28-74.64	80.35-87.82	....	....
6	7	104.82-114.57	123.33-134.81	....	....

Pipe Cast Iron: Class B, 6-in. and over, $98.50 per net ton, Birmingham; $106.70, del. Chicago; 4-in. pipe, $5 higher; Class A pipe, $5 a ton over Class B.

Rails, Supplies

Rails: Standard, over 60-lb; $3.20 per 100 lb mill, except: $3.30, Minnequa, Colo.

Light (billet): $3.55 per 100 lb, mill, except: $4.25, Minnequa, Colo.

Light (rail steel): $4.50 per 100 lb, Williamsport, Pa.; 3.55c, Huntington, W. Va.

Railroad Supplies: Track bolts, treated: $8.50 per 100 lb, mill. Untreated: $8.25, mill.

Tie Plates: 4.05c mill, except: 4.20c, Pittsburg, Torrance, Calif.; 4.50c, Seattle.

Splice Bars: 4.25c, mill.

Standard Spikes, 5.35c, mill.

Axles: 5.20c, mill.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., furnace	$48.00	$48.50	$49.00	$49.50
Newark, N. J., del.	50.5334	51.0334	51.5334	52.0334
Brooklyn, N. Y., del.	....	52.634	53.134	....
Philadelphia, del.	50.3002	50.8002	51.3002	51.8002
Birmingham, furnace	42.88	43.38	....	....
Cincinnati, del.	....	49.43	....	....
Buffalo, furnace	47.00	47.00	47.50	48.00
Boston, del.	56.20	56.20	56.70	....
Rochester, del.	49.35	49.35	49.85	50.35
Syracuse, del.	50.2065	50.2065	50.7065	41.2065
§Chicago, district furnaces	46.00	46.00-46.50	46.50	47.00
Milwaukee, del.	47.82	47.82-48.32	48.32	48.82
Muskegon, Mich., del.	....	51.28-51.78	51.78	....
Cleveland, furnace	46.00	46.50	46.50	47.00
Akron, del.	48.3002	48.8002	48.8002	49.3002
Lone Star, Tex., furnace	46.00	†46.50	....	....
Gulf ports, del.	50.50	51.00	....	....
Duluth, furnace	....	46.50	46.50	47.00
Erie, Pa., furnace	46.00	46.50	46.50	47.00
Everett, Mass., furnace	....	52.50	53.00	....
Geneva, Utah, furnace	46.00	46.50	....	....
Seattle, Tacoma, Wash., del.	....	54.0578	....	....
Portland, Oreg., del.	....	54.0578	....	....
Los Angeles, San Francisco	53.5578	54.0578	....	....
Granite City, Ill., furnace	47.90	48.40	48.90	....
St. Louis, del.	49.40	49.90	50.40	....
Ironton, Utah, furnace	47.00	47.50	....	....
‡Neville Island, Pa., furnace	46.00	46.50	46.50	47.00
Pittsburgh, del., N.&S. Sides	47.08	47.58	47.58	48.08
Pittsburgh (Carnegie), furnaces	46.00	....	....	47.00
Sharpsville, Pa., furnace	46.00	46.50	46.50	47.00
Steelton, Pa., furnace	48.00	48.50	49.00	49.50
Struthers, O., furnace	46.00	....	....	....
Swedeland, Pa., furnace	50.00	50.50	51.00	....
Toledo, O., furnace	46.00	46.50	46.50	47.00
Cincinnati, del.	50.8230	51.3230	....	....
Youngstown, O., furnace	46.00	46.50	46.50	47.00
Mansfield, O., del.	50.1022	50.6022	50.6022	51.1022

† Low phosphorus southern grade.

‡ To Neville Island base add: $0.86 for McKees Rocks, Pa.; $1.31 Lawrenceville, Homestead, McKeesport, Monaca; $1.73 Verona; $1.94 Brackenridge; $1.08 for Ambridge and Aliquippa.

§ Includes, in addition to Chicago, South Chicago, Ill., East Chicago, Gary and Indiana Harbor, Ind.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent Si (base) .$59.50
6.51-7.00.. 60.75 9.01- 9.50. 67.00
7.01-7.50.. 62.00 9.51-10.00. 68.25
7.51-8.00.. 63.25 10.01-10.50. 69.50
8.01-8.50.. 64.50 10.51-11.00. 70.75
8.51-9.00.. 65.75 11.01-11.50. 72.00

F.o.b. Jackson, O., per gross ton. Buffalo furnace $1.25 higher.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron Si 14.01-14.50%, $78.50 furnace. Niagara Falls; $84 open-hearth and $85 foundry grade, Keokuk, Iowa. Piglets, Si 16%, $91, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 a ton for 0.45% max. P.

Charcoal Pig Iron

Semi-cold blast, low phosphours. F.o.b. furnace, Lyles, Tenn....$66 (For higher silicon iron a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Low Phosphorus

Steelton, Pa., Troy, N. Y., $54; Philadelphia, $56.9786 del. Intermediate phosphorus, Central furnace, Cleveland, $51.

Electrodes

(Threaded, with nipples, unboxed)

Inches Diam.	Length	Cents per lb. f.o.b. plant
	Graphite	
17, 18, 20	60, 72	16.00
8 to 16	48, 60, 72	16.50
7	48, 60	17.75
8	48, 60	19.00
4, 5⅛	40	19.50
3	40	20.50
2½	24, 30	21.00
2	24, 30	23.00
	Carbon	
40	100, 110	7.50
35	100, 110	7.50
30	84, 110	7.50
24	72 to 104	7.50
17 to 20	84, 90	7.50
14	60, 72	8.00
10, 12	60	8.25
8	60	8.50

Fluorspar

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.

Metallurgical Coke

Price per Net Ton

Beehive Ovens	
Connellsville, furnace..	$13.50-15.50
Connellsville, foundry..	16.00-18.00
New River, foundry	16.50
Wise county, foundry..	15.35
Wise county, furnace..	14.60
Oven Foundry Coke	
Kearney, N. J., ovens.	$22.00
Everett, Mass., ovens. New England, del.‡.	23.35
Chicago, ovens	20.40
Chicago, del.	†21.85
Detroit, del.	24.16
Terre Haute, ovens	20.20
Milwaukee, ovens	21.15
Indianapolis, ovens	20.85
Chicago, del.	24.19
Cincinnati, del.	23.66
Detroit, del.	24.61
Ironton, O., ovens	19.40
Cincinnati, del.	21.63
Painesville, O., ovens..	20.90
Buffalo, del.	23.42
Cleveland, del.	22.55
Erie, del.	22.70
Birmingham, ovens	17.70
Philadelphia, ovens	21.05
Swedeland, Pa., ovens.	21.00
Portsmouth, O., ovens.	19.50
Detroit, ovens	20.65
Detroit, del.	*21.70
Buffalo, del.	22.75
Flint, del.	22.98
Pontiac, del.	21.98
Saginaw, del.	23.30

Includes representative switching charge of: *, $1.05; †, $1.45. ‡ Or within $4.03 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens (Price effective as of Aug. 5)

Pure benzol	20.00
Toluol, one degree	20.50-26.50
Toluol, two degrees	23.00-26.50
Industrial xylol	20.50-26.50
Per ton bulk, ovens	
Sulphate of ammonia	$45.00
Per pound, ovens (Effective as of Oct. 1)	
Phenol, 40 (carlots, returnable drums)	13.50
Do., less than carlots	14.25
Do., tank cars	12.50
(Effective as of Oct. 25)	
Naphthalene flakes, balls, bbl to jobbers, "household use"	13.75

Refractories

(Prices per 1000 brick, f.o.b. plant)

Fire Clay Brick

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $100. Hard-fired, $135 at above points.

High-heat Duty: Salina, Pa., $85; Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $80.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., Ottawa, Ill., $66.

Ladle Brick

Dry Press: $55, Freeport, Merill, Station, Clearfield, Pa.; Chester, New Cumberland, W. Va.; Irondale, Wellsville, O.

Wire Cut: $53, Chester, New Cumberland, W. Va.; Wellsville, O.

Malleable Bung Brick

St. Louis, Mo., Olive Hill, Ky., Ottawa, Ill., $90; Beach Creek, Pa., $80.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., $80; Hays, Pa., $85; Joliet or Rockdale, Ill., E. Chicago, Ind., $89; Lehi, Utah, Los Angeles, $95.

Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., Birmingham, $80.

Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $81.

Basic Brick

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $66; chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

Magnesite

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains; Bulk, $30.50-31.00; single paper bags, $35.00-35.50.

Dolomite

(Base prices per net ton)

Domestic, dead-burned bulk: Billmeyer, Blue Bell, Williams, Plymouth Meeting,, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibonsburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural)

Lower Lake Ports

(Any increase or decrease in R.R. freight rates, dock handling charges and taxes thereon effective after Dec. 31, 1948, are for buyer's account.)

Old range bessemer	$7.60
Old range nonbessemer	7.45
Mesabi bessemer	7.35
Mesabi nonbessemer	7.20
High phosphorus	7.20

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% concentrates, contract	16.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	17.00
Brazil iron ore, 68-69%	19.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$26–$28

Manganese Ore

Long term contracts, involving large tonnages, prices are nominal; nearby, 48%, duty paid, 81.8c-83.8c per long ton unit, c.i.f. United States ports; prices on lower grades adjusted to manganese content and impurities.

Chrome Ore

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S.C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	29.00-30.00
50% no ratio	29.50-30.50
Brazilian—nominal	
44% 2.5:1 lump	$33.65
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb. Mo., cont., Mines	$0.90

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS			STRIP		BARS				PLATES	
	H-R 10 Ga.	C-R 17 Ga.	Gal. *10 Ga.	†H-R	†C-R	H-R Rds. ⅜" to 3"	C-F Rds. ½" & up	H-R Alloy **4140	Standard Structural Shapes	Carbon ⅜"-¾"	Floor ⅜" & Thicker
New York (city)	6.00	6.66	7.40	5.92	...	5.77	6.56	8.68	5.53	5.90	7.36
New York (c'try)	5.80	6.46	7.20	5.72	...	5.57	6.36	8.48	5.33	5.70	7.16
Boston (city)	6.10	6.70	8.00	6.10	...	5.67	6.42	8.72	5.57	5.95	7.40
Boston (c'try)	5.95	6.55	7.85	5.95	...	5.52	6.27	8.57	5.42	5.80	7.25
Phila. (city)	5.72	6.64	7.53-7.58	5.60	...	5.55	6.34	8.40	5.25	5.53	6.74
Phila. (c'try)	5.57	6.59	7.38-7.43	5.45	...	5.40	6.19	8.25	5.10	5.38	6.59
Balt. (city)	5.46†	6.36	7.26	5.52	...	5.57	6.31	...	5.51	5.71	7.16
Balt. (c'try)	5.31†	6.21	7.11	5.37	...	5.42	6.16	...	5.36	5.56	7.01
Norfolk, Va.	5.80	...	...	...	...	6.05	7.05	...	6.05	6.05	7.55
Wash. (w'hse)	5.84-6.00	...	...	5.90	...	5.91-5.95	6.61	...	5.85-5.89	6.05-6.09	7.50-7.54
Buffalo (del.)	5.00	6.05	7.85	5.49	6.50	5.20	6.05	10.13	5.25	5.50	7.06
Buffalo (w'hse)	4.85	5.90	7.70	5.34	6.35	5.05	5.90	9.98	5.10	5.35	6.91
Pitts. (w'hse)	4.90§	5.75[5]	7.15	5.10	6.00	4.90	5.65	9.60	4.90	5.05-5.10	6.55
Detroit (w'hse)	4.85-5.00§	5.75-5.85[5]	7.15	5.00-5.35	5.95-6.00	5.45	6.17	8.12	5.45	5.65-5.80	7.10
Cleveland (del.)	5.13-5.90‡‡	5.90-6.31	6.90-8.10‡‡	5.18-5.31	6.40-6.65	5.32-5.36	6.05	8.24-8.40	5.35-5.62	5.52-5.56	6.95-7.01
Cleve. (w'hse)	4.98-5.75	5.75-6.16	6.75-7.95	5.03-5.16	6.25-6.50	5.17-5.21	5.90	8.24-8.25	5.21-5.47	5.37-5.41	6.80-6.86
Cincin. (w'hse)	5.29	6.14	7.63	5.55	6.10	5.55	6.10	...	5.40	5.64	6.94
Chicago (city)	5.20	5.90‡[5]	7.20	5.00	6.67-6.83	5.05	5.85	8.25[9]	5.05	5.25	6.70
Chicago (w'hse)	4.85-5.05	5.75‡[5]	7.05	4.85	6.52-6.68	4.90	5.70	8.10[9]	4.90	5.10	6.55
Milwaukee (city)	5.38	6.08‡[5]	7.38	5.18	6.82-7.01	5.23	6.03	8.43[9]	5.23	5.43	6.88
St. Louis (del.)	5.34§	6.24[5]	7.44	5.34	6.64	5.39	6.19[12]	6.64	5.39	5.59	7.04
St. L. (w'hse)	5.19§	6.09[5]	7.29	5.19	6.49	5.24	6.04[12]	9.49	5.24	5.44	6.89
Birm'ham (city)	5.20§	...	6.60	5.20	...	5.15	6.66-6.83	...	5.15	5.40	7.41-7.73[20]
Birm'ham (c'try)	5.05§	...	6.45	5.05	...	5.00	6.51-6.68	...	5.00	5.25	7.26-7.58[20]
Omaha, Nebr.	6.10-6.35	...	10.04	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Los Ang. (city)	6.60§	8.05	8.20†	6.80	9.50	6.25	8.20	...	6.10	6.30	8.20
L. A. (w'hse)	6.45§	7.90	8.05†	6.65	9.35	6.10	8.05	...	5.95	6.15	8.05
San Francisco	5.95[21]	7.15	8.05	6.75[21]	8.25[18]	5.90[21]	7.55	10.20‡‡	5.90	7.60	8.10
Seattle-Tacoma	6.35[17]	7.90[5]	8.40	6.70[17]	...	6.20[17]	8.15[1]	9.45[2]	6.30[17]	6.35[17]	8.40[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [3]—450 to 39,999 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [6]—400 to 14,999 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [16]—2000 lb and over; [17]—300 to 999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [22]—500 to 1499 lb; [23]—Price (but not other price in range) applies to any and all quantities.

• Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § 18 gage and heavier; ** as rolled; †† add 0.40 for sizes not rolled in Birmingham; ‡‡ top level of quoted range is nominal.

PRICES OF LEADING FERROALLOY PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si) Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, c.l., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base Price: $165, Rockwood, Tenn.; $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $163, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P. 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c, Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload, 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Manganese, Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 30c; 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, F.o.b. cars Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17.5%, deduct 0.2c from above prices. Spot, add 0.25c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si; packed 19.90-21.70c; ton lots 21.00-22.60c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk 14.65-15c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Odd 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe.). C.l., lump, bulk, regular 19.0c per lb of Si c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 8.15c per lb of alloy, ton lots packed 9.55c, 200 to 1999 lb 9.90c, smaller lots 10.40c. Delivered. Spot up 0.5c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 20.5c per lb of contained Cr; c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8MxD, bulk 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.25c, 0.06% C 28.75c, 0.10% C 28.25c- 28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lot 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr, and 1% Fe). Contract, carload, 1" x D; packed, max. 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot, add 0.25c.

For prices of other ferroalloy products please refer to Apr. 4 issue, page 174.

Metal Price Tone Remains Weak

Producers reduce zince to basis of 15.00c, East St. Louis, for prime western while lead drops further to basis of 14.80c to 14.85c, St. Louis, for the common grade. Buying is light

New York—Undertone of nonferrous metal markets remained weak last week, with zinc declining 1 cent a pound to the basis of 15.00c, East St. Louis, for prime western. Downward revisions were also posted on lead and many grades of scrap.

Zinc—The domestic zinc market at the 15-cent level was at the lowest level recorded since October, 1948, but was well above the OPA ceiling of 9.25c. The latest reduction is attributed to the excess of available supplies over current purchases. Smelters, as usual, are unwilling to accumulate unsold stocks. While market interests were reluctant to forecast the duration of the present downward price trend, it was pointed out that July and forward deliveries were sold on the Commodity exchange at 14.00c.

Producers of rolled zinc and zinc oxides have lowered their quotations in line with revisions in the primary zinc market.

Lead—At the opening of the month, one of the largest lead sellers reduced prices 1 cent per pound and was followed by other sellers by Monday, Apr. 4 when the market was quotable at 15.80c to 15.85c, St. Louis for the common grade. On Apr. 6, the market dropped 1 cent further to 14.80c to 14.85c. This brought the total decline since Mar. 8 to 6½ cents per pound from the all-time high of 21.50c per pound. Buying interest failed to show any appreciable improvement at the new level. Inquiry for April metal has been disappointing to most every producer.

The Canadian market has followed closely the movements of the markets here, prices having fallen 5 cents a pound, narrowing the spread at Montreal and Toronto to ¼-cent below the New York market.

Domestic producers of lead sheets, pipe, pigments and oxides have revised their quotations in line with the drop in the primary lead market.

Copper—In commenting on the present situation in copper, Louis S. Cates, chairman, Phelps Dodge Corp., said that his company's output was up to the quarterly rate of last year and that sales were about in line with the quarterly average for 1948. He is quoted in the trade here as saying:

"There is bound to be some shading of prices. Metal users are becoming uneasy, as prices of lead and zinc have declined and consumers are trying to live off their metal inventories."

Barring some major upset, copper prices will stabilize well above the prewar average of around 12.00c per pound, Mr. Cates believes, although he ventured no opinion as to the stabilization level. He pointed out that there is much high-cost production that will drop out as prices decline.

Mr. Cates said that while the brass mill business is down, sales to the wire and cable industries continue good and that the demand from the automobile industry is holding up well.

General Cable Corp. has reduced prices of building wire products by 5 to 10 per cent in order to meet competition. This brings the reductions for the year to date to a range of 20 to 25 per cent. An official of the company is quoted as saying that price-cutting by certain interests has been going on quietly in the market for some time.

The President has signed a bill suspending the import tax on copper to June 30, 1950.

Prices in the primary copper market held unchanged last week on the basis of 23.25c to 23.50c, delivered Connecticut Valley points.

Tin—Stocks of pig tin in the United States, aside from some 36,000 tons in the permanent stockpile, totaled about 40,000 tons as of Feb. 28, according to the British Bureau of Metal Statistics. This would be equivalent to about eight months' permitted allocations and perhaps the overall requirements for that period. The U. S. stocks are expected to show a sharp increase in March and April due to heavy imports and the decline in consumers' applications for the metal.

Output of refined tin by the Longhorn smelter in March amounted to 3104 tons, making the total for the first quarter 9615 tons compared with 8754 tons in the like 1948 period.

The partial buyers' market evident in recent months in some types of containers may encompass all segments of the industry before the close of 1949, the Northern Trust Co., Chicago, states. Demand for metal containers shows some signs of easing and supplies of both sheet steel and pig tin have undergone definite improvement in the past year.

With demand tapering off and raw materials in better supply, metal container output in 1949 may come closer to meeting consumer needs than in any year since 1941.

Wire Firms Sign Contracts

Louisville, Ky.—Contracts signed with three converting plants will enable the Reynolds Metals Co. to deliver a minimum of 13,500,000 pounds of aluminum cable, steel reinforced (ACSR) to rural electric cooperatives of the nation in 1949, David P. Reynolds, the company's vice-president and general sales manager, announced in Louisville last week.

Mr. Reynolds said that firms contracting with Reynolds to produce the new cable are the Bergen Wire Rope Co., Lodi, N. J.; Midland Wire Corp., Tiffin, O.; and the Southern Electrical Corp., Chattanooga, Tenn.

Reynolds will supply coiled aluminum wire and rod to the three firms for production of ACSR conductor. Entire output has been contracted for by the Wisconsin Electric Cooperative for distribution to REA sponsored rural electric cooperatives all over the country.

In addition, Reynolds' existing facilities will produce a portion of this cable. REA officials estimate that 27,000 miles of rural power line poles are now standing awaiting installation of this aluminum cable.

Reports Large Zinc Reserves

St. Louis—Commenting on American Zinc, Lead & Smelting Co.'s fiftieth anniversary, celebrated on Jan. 26, Howard I. Young, president, said that the now unmined mineral deposits in the company's reserves today are "believed to be as high as at any time in the history of the company."

The production capacity of slab zinc facilities, which are the largest in the history of the company, now represents about 10 per cent of the total United States zinc smelting capacity. Slab zinc production totaled 97,364 tons in 1948 compared with 91,399 tons in 1947; zinc oxide, 22,003 tons against 35,458; metallic cadmium, 340 tons against 555 tons.

Aluminum Stocks Increase

Washington—Primary aluminum production in January totaled 53,356 short tons, about the same as December output, according to the Bureau of Mines. Month-end stocks of primary aluminum at reduction plants increased 31 per cent to 17,310 tons, the largest quantity reported since November, 1947. Although prices of secondary ingot were about 8 cents a pound higher than corresponding grades of primary ingot on Jan. 1, 1949, those of secondary ingot were cut from 1.5 to 2 cents a pound during the month. Prices of most aluminum-base scrap items fell about 1 cent a pound.

Aluminum Added to Line

Chicago—United States Steel Supply Co., warehousing subsidiary of United States Steel Corp., has added aluminum to its regular line of metal products, Leslie B. Worthington, president, has announced.

He said arrangements have been completed with Reynolds Metals Co. to handle its complete line of aluminum mill and building products in the U. S. Steel Supply Co.'s fourteen warehouses located in principal cities from coast to coast.

In commenting on the move, Mr. Worthington said: "The distribution of aluminum by our company is evidence of our desire to satisfy more fully the metal requirements of our customers."

Donald F. Stone, manager of the company's newly created aluminum sales division, said that, for the present, aluminum mill products such as structurals, bars and sheets will be stocked only at the firm's Los Angeles, San Francisco and Chicago warehouses. He said it is planned that each of the company's warehouses will handle a full line of aluminum building products such as corrugated sheets, siding, etc.

NONFERROUS METAL PRICES

(Cents per pound, carlots, except as otherwise noted)

Copper: Electrolytic, 23.25-23.50c, Conn. Valley; Lake, 23.62½c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 18.00-18.50c; 88-10-2 (No. 215) 27.50c; 80-10-10 (No. 305) 23.75c; No. 1 yellow (No. 405) 15.00-16.00c.

Zinc: Prime western 15.00c, brass special 15.25c, intermediate 15.50c, East St. Louis; high grade 16.00c, delivered.

Lead: Common 14.80-14.85c; chemical, 14.90c; corroding 14.90-14.95c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, f.o.b. shipping point.

Secondary Aluminum: Piston alloy (6-6 type) 18.25-18.50c; No. 12 foundry alloy (No. 2 grade) 17.00-17.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 19.00c; grade 2, 18.00c; grade 3, 17.00c; grade 4, 16.00c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, f.o.b. Freeport, Tex.

Tin: Grade A, 99.8% or higher (including Straits) $1.03; grade B, 99.8% or higher, not meeting specifications for grade A, with 0.05% max. arsenic, $1.028; grade C, 99.65-99.79%, incl., $1.024; 99.5-99.649% $1.024, grade F, 98-98.999% $1.015 for tin content. Prices are ex-dock, New York, in 5-ton lots.

Antimony: American 99-99.8% and over but not meeting specifications below, 38.50c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 39.00c, f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $87-$90 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.

Cobalt: 97-98%, $1.80 per lb for 550 lb (keg); $1.82 per lb for 100 lb (case); $1.87 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 71.50c per ounce.

Platinum: $72-$75 per ounce.

Palladium: $24 per troy ounce.

Iridium: $100-$110 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill)

Sheet: Copper 37.18; yellow brass 34.10; commercial bronze, 95%, 37.16; 90%, 36.73; red brass, 85%, 35.79; 80%, 35.37; best quality, 34.92; nickel silver, 18%, 46.62; phosphor-bronze, grade A, 5%, 56.05.

Rods: Copper, hot rolled 33.03; cold drawn 34.28; yellow brass, free cutting, 28.63; commercial bronze, 95% 36.85; 90% 36.42; red brass, 85% 35.48; 80% 35.06.

Seamless Tubing: Copper 37.22; yellow brass 37.11; commercial bronze 90% 39.39; red brass 85% 38.70; 80% 38.28.

Wire: Yellow brass 34.39; commercial bronze, 95% 37.45; 90% 37.02; red brass, 85% 36.08; 80% 35.66; best quality brass 35.21.

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 29.42½c, l.c.l. 29.92½-30.05c; weatherproof, f.o.b. eastern mills, c.l. 29.60-29.85c, l.c.l. 30.35c; magnet, delivered, c.l. 32.75-33.50c, 15,000 lb or more 33.00-33.75c, l.c.l. 33.50-34.25c.

ALUMINUM

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-20	36.8	33.4	39.5
0.008-0.0075	12-20	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R317-T4	——Hexagonal—— 17S-T4
0.125	48.0	...	...
0.156-0.203	41.0	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	...	37.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	32.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $20.00 per cwt.; add 50c per cwt., 10 sq ft to 140 sq ft. Pipe: Full coils, $20.00 per cwt; cut coils, $20.00. Traps and Bends: List price plus 55%.

ZINC

Sheets, 20.00-20.50c, f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 19.25c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 18.25c; over 12-in., 19.25c.

NICKEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill.)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c, Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb. 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

Plating Materials

Chromic Acid: 99.9%, flake, f.o.b. Philadelphia, carloads, 26.00c; 5 tons and over 26.50c; 1 to 5 tons, 27.00c; less than 1 ton, 27.50c.

Copper Anodes: Base, 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat untrimmed 33.84c; oval 33.34c; electrodeposited, 31.09c; cast, 30.12c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 48.00c, f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,900 lb, 17.00c, f.o.b. Niagara Falls, N. Y.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 26.25c; over 250 lb, 25.25c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 10 lb, 64.00c; f.o.b. Cleveland. Add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbl, 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over 119.00c; 500 to 999 lb, 119.50c; 200 to 499 lb, 120.00c; less than 200 lb, 121.50c; ball, 1000 lb and over, 121.25c; 500 to 999 lb, 121.75c; 200 to 499 lb, 122.25c; less than 200 lb, 123.75c f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 71.8c; 100 or 300 lb drums only, 100 to 500 lb, 63.6c; 600 to 1900 lb, 61.2c; 2000 to 9900 lb, 59.4c. Prices f.o.b Sewaren, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100-lb drums 42.50c, f.o.b. Cleveland; 43.00c, Detroit; 42.00c, f.o.b. Philadelphia.

Stannous Sulphate: Less than 2000 lb in 100 lb kegs, 100.00c, in 400 lb bbl, 99.00c; more than 2000 lb, in 100 lb kegs, 99.00c, in 400 lb bbl, 98.00c, f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, 97.00c; in 100 lb kegs, 98.00c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.125	21.125	20.375
Yellow brass	18.375	18.125	17.500
Commercial Bronze			
95%	20.125	19.875	19.375
90%	20.000	19.750	19.250
Red Brass			
85%	20.000	19.750	19.250
80%	19.875	19.625	19.125
Best Quality (71-79%)	19.750	19.500	19.000
Muntz Metal	18.250	18.000	17.500
Nickel, silver, 10%	20.250	20.250	10.125
Phos. bronze, A	22.625	22.375	21.375
Naval brass	18.750	18.500	18.000
Manganese bronze	18.750	18.500	17.875

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, f.o.b. shipping point, carload lots)

No. 1 copper 15.75-16.00, No. 2 copper 14.75-15.00, light copper 13.75-14.00, composition red brass 11.75-12.00, auto radiators 9.50-9.75, heavy yellow brass 8.75-9.25.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 16.00, No. 2 copper 15.00, light copper 14.00, refinery brass (60% copper), per dry copper content 14.00.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 14.75-15.00, No. 2 13.75-14.00, light copper 12.75-13.00, No. 1 composition red brass 9.50-9.75, No. 1 composition turnings 9.00-9.25, mixed brass turnings 7.50-7.75, new brass clippings 12.75-13.00; No. 1 brass rod turnings 9.00-9.25, light brass 6.50-6.75, heavy yellow brass 7.50-7.75, new brass rod ends 10.75-11.25, auto radiators, unsweated 8.75-9.00, cocks and faucets 8.75-9.00, brass pipe 8.75-9.00.

Lead: Heavy 8.00-8.50, battery plates 4.25-4.50, linotype and stereotype 11.50-12.00, electrotype 9.50-10.00, mixed babbitt 11.50-12.00, solder joints, 14.00-14.50.

Zinc: Old zinc 6.50-7.00, new die cast scrap 6.50-7.00, old die cast scrap 4.50-5.00.

Tin: No. 1 pewter 56.00-58.00, block tin pipe 78.00-80.00, No. 1 babbitt 43.00-45.00, siphon tops 47.00-49.00.

Aluminum: Clippings 2S 11.00-11.50, old sheets 7.00-7.50, crankcase 7.00-7.50, borings and turnings 3.50-4.00, pistons, free of struts, 7.00-7.50.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Mar. Ave.	23.486	18.825	17.056	103.00	17.00	38.50	40.00	71.50
Apr. 1-2	23.25-23.50	15.85-16.80	16.00	103.00	17.00	38.00	40.00	71.50
Apr. 4	23.25-23.50	15.80-15.85	16.00	103.00	17.00	38.50	40.00	71.50
Apr. 5	23.25-23.50	15.80-15.85	15.00	103.00	17.00	38.50	40.00	71.50
Apr. 6-7	23.25-23.50	14.80-14.85	15.00	103.00	17.00	38.50	40.00	71.50

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt	$26.00-27.00
No. 2 Heavy Melt	24.00-25.00
No. 1 Busheling	26.00-27.00
No. 1 Bundles	26.00-27.00
No. 2 Bundles	22.00-23.00
No. 3 Bundles	21.00-23.00
Heavy Turnings	23.00-24.00
Machine Shop Turnings	17.00-18.00‡
Mixed Borings, Turnings	18.00-19.00‡
Short Shovel Turnings	22.00-23.00‡
Cast Iron Borings	18.00-19.00‡
Bar Crops and Plate	28.50-29.50
Low Phos. Steel	28.50-29.50

Cast Iron Grades†

Mixed Yard	34.00-35.00
No. 1 Machinery Cast	37.00-38.00
Charging Box Cast	35.00-36.00
Heavy Breakable Cast	32.00-33.00
Brake Shoe	35.00-36.00

Railroad Scrap†

No. 1 R.R. Heavy Melt	28.00
Axles	38.00-39.00
Rails, Random Lengths	35.00-36.00*
Rails, 2 ft and under	39.00-40.00
Rails, 18 in. and under	40.00-41.00
Railroad Specialties	32.00-33.00
Angles, Splice Bars	35.00-36.00

* Brokers' buying prices.
† Nominal.
‡ Brokers offering prices.

CLEVELAND

Heavy Melt. Steel	$22.00†
No. 1 Busheling	22.00†
No. 2 Bundles	21.50†
Machine Shop Turnings	15.00†
Mixed Borings, Turnings	20.00-20.50
Short Shovel Turnings	20.00-20.50
Cast Iron Borings	20.00-20.50
Bar Crops and Plate	26.50†
Punchings & Plate Scrap	26.50†
Cut Structurals	28.50†

Cast Iron Grades†

No. 1 Cupola	35.00-36.00
Charging Box Cast	33.00-35.00
Stove Plate	31.00-33.00
Heavy Breakable Cast	27.00-28.00
Unstripped Motor Blocks	27.00-28.00
Malleable	31.00
Brake Shoes	28.00-28.50
Clean Auto Cast	38.00-38.50
No. 1 Wheels	33.00-34.00
Burnt Cast	26.00-27.00

Railroad Scrap

No. 1 R.R. Heavy Melt	30.00
R.R. Malleable	36.00†
Rails, 3 ft and under	38.00-40.00
Rails, Random Lengths	32.00-34.00
Cast Steel	33.00
Railroad Specialties	33.00
Uncut Tires	32.00
Angles, Splice Bars	36.00-37.00

† Nominal.

VALLEY

Heavy Melt. Steel	$24.00†
No. 1 Bundles	24.00†
No. 2 Bundles	23.00†
Machine Shop Turnings	17.00†
Short Shovel Turnings	22.00†
Cast Iron Borings	22.00†
Low Phos.	28.50†

Railroad Scrap

No. 1 R.R. Heavy Melt	31.00

† Nominal.

MANSFIELD

Machine Shop Turnings	$17.00†
Short Shovel Turnings	22.00†

† Nominal.

CINCINNATI

No. 1 Heavy Melt. Steel	$26.00
No. 2 Heavy Melt. Steel	26.00
No. 1 Busheling	26.00
Nos. 1 & 2 Bundles	24.00
Machine Shop Turnings	15.00
Mixed Borings, Turnings	15.00
Short Shovel Turnings	15.00
Cast Iron Borings	16.00

Cast Iron Grades

No. 1 Cupola Cast	38.00
Charging Box Cast	32.00
Heavy Breakable Cast	32.00
Stove Plate	28.00
Unstripped Motor Blocks	24.00
Brake Shoes	24.00
Clean Auto Cast	38.00
Drop Broken Cast	42.00

Railroad Scrap

No. 1 R.R. Heavy Melt	28.00
R.R. Malleable	26.00
Rails, Rerolling	35.00
Rails, Random Lengths	32.00
Rails, 18 in. and under	42.00

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 1 Bundles	$20.00-21.00
No. 2 Bundles	19.00-20.00
No. 2 Heavy Melt. Steel	20.00-21.00
No. 1 Busheling	20.00-21.00
Machine Shop Turnings	11.00-12.00
Mixed Borings, Turnings	12.00-13.00
Short Shovel Turnings	13.00-14.00
Cast Iron Borings	13.00-14.00
Punchings & Plate Scrap	22.00-23.00

Cast Iron Grades

No. 1 Cupola Cast	26.00-28.00
Heavy Breakable Cast	21.00-23.00
Clean Auto Cast	26.00-28.00

BUFFALO

No. 1 Heavy Melt. Steel	$25.50-26.00
No. 2 Heavy Melt. Steel	21.50-22.00
No. 1 Bundles	22.00
No. 2 Bundles	19.50-20.00
No. 1 Bushelings	21.50-22.00
Machine Shop Turnings	16.50-17.00
Mixed Borings, Turnings	16.50-17.00
Cast Iron Borings	16.50-17.00
Short Shovel Turnings	18.50-19.00
Low Phos.	27.00-28.00

Cast Iron Grades

Mixed Yard Cast	28.00-30.00
Heavy Breakable	27.00-29.00
Malleable	32.00-34.00
Clean Auto Cast	33.00-34.00

Railroad Scrap

Rails 3 ft. and under	38.50-39.00
Scrap Rails	34.50-35.00
Specialties	34.50-35.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$24.00-25.00
No. 2 Heavy Melt. Steel	21.00-22.00
No. 1 Busheling	21.00-22.00
No. 1 Bundles	24.00-25.00
No. 2 Bundles	20.00
Machine Shop Turnings	16.00
Mixed Borings, Turnings	14.00-15.00
Short Shovel Turnings	20.00-21.00
Bar Crop and Plate	27.00-28.00
Punchings & Plate Scrap	27.00-28.00
Cut Structurals	27.00-28.00
Elec. Furnace Bundles	24.00
Heavy Turnings	24.00-25.00
No. 1 Chemical Borings	Nom.

Cast Iron Grades

No. 1 Cupola Cast	27.00
No. 1 Machinery Cast	29.00-30.00
Charging Box Cast	27.00-28.00
Heavy Breakable Cast	27.00-28.00
Unstripped Motor Blocks	24.50
Clean Auto Cast	29.00-30.00
No. 1 Wheels	29.00-30.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	$18.00
No. 2 Heavy Melt. Steel	14.00-15.00
No. 1 Busheling	14.00-15.00
No. 1 Bundles	17.00-18.00
No. 2 Bundles	15.00
No. 3 Bundles	nominal
Machine Shop Turnings	5.00-6.00
Mixed Borings, Turnings	5.00-6.00
Short Shovel Turnings	7.00-8.00
Punchings & Plate Scrap	18.00-19.00
Cut Structurals	nominal
Elec. Furnace Bundles	18.00-19.00

Cast Iron Grades

No. 1 Cupola Cast	20.00-21.00
No. 1 Machinery	21.00-22.00
Charging Box Cast	18.00-18.50
Heavy Breakable	18.00-18.50
Unstripped Motor Blocks	nom.
Malleable	nom.

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	$17.00-17.50
No. 2 Heavy Melt. Steel	14.00-14.50
No. 1 Bundles	15.00-16.00
No. 1 Busheling	14.00-14.50
Machine Shop Turnings	8.50-9.00
Mixed Borings, Turnings	8.00-8.50
Short Shovel Turnings	12.00-16.00
Bar Crops and Plate	28.00-29.00
Punchings & Plate Scrap	28.00-29.00
Chemical Borings	25.00-26.00

Cast Iron Grades

No. 1 Cupola Cast	25.00-26.00
Mixed Cast	22.00-24.00
Heavy Breakable Cast	24.00-25.00
Stove Plate	22.00-24.00
Unstripped Motor Blocks	18.00-20.00

CHICAGO

No. 1 Heavy Melt. Steel	$25.00-26.00
No. 2 Heavy Melt. Steel	24.00-25.00
No. 1 Bundles	24.00-26.00
No. 2 Bundles	21.00-22.00
No. 3 Bundles	19.00-20.00
Machine Shop Turnings	14.00-15.00
Mixed Borings, Turnings	14.00-15.00
Short Shovel Turnings	14.00-15.00
Cast Iron Borings	14.00-15.00
Bar Crops and Plate	30.00-32.00
Punchings	30.00-32.00
Elec. Furnace Bundles	24.00-25.00
Heavy Turnings	25.00-26.00
Cut Structurals	30.00-31.00

Cast Iron Grades*

No. 1 Cupola Cast	34.00-35.00
Clean Auto Cast	34.00-35.00
No. 1 Wheels	33.00-35.00

Railroad Scrap

No. 1 R.R. Heavy Melt	27.00-34.50†
Malleable	30.00-31.00
Rails, Rerolling	33.00-35.00
Rails, Random Lengths	30.00-31.00
Rails, 3 ft. and under	37.00-38.00
Rails, 18 in. and under	40.00-41.00
Railroad Specialties	37.00-38.00
Angles, Splice Bars	36.00-37.00

† Top price represents earmarked scrap. * Nominal.

ST. LOUIS

No. 1 Heavy Melt. Steel	$30.00-31.00
No. 2 Heavy Melt. Steel	25.00-26.00
Machine Shop Turnings	15.00-16.00
Short Shovel Turnings	15.00-16.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00
Charging Box Cast	29.00-30.00
Heavy Breakable Cast	28.00-29.00
Brake Shoes	30.00-31.00
Clean Auto Cast	36.00-38.00
Burnt Cast	30.00-31.00

Railroad Scrap

R.R. Malleable	30.00-31.00
Rails, Rerolling	33.00-35.00
Rails, Random Lengths	29.00-30.00
Rails, 3 ft. and under	34.00-35.00
Uncut Tires	34.00-35.00
Angles, Splice Bars	34.00-35.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	**$29.00**
No. 2 Heavy Melt. Steel	**29.00**
No. 1 Busheling	**29.00**
No. 2 Bundles	**27.00**
Long Turnings	**24.00**
Short Shovel Turnings	**24.50**
Cast Iron Borings	**24.50**
Bar Crops and Plate	**35.00**
Cut Structurals	**36.00**

Cast Iron Grades

No. 1 Cupola Cast	**41.00-42.00**
Stove Plate	**38.00-39.00**
No. 1 Wheels	**39.00-40.00**

Railroad Scrap

No. 1 R.R. Heavy Melt.	**32.50**
R.R. Malleable	**nominal**
Rails, Rerolling	**41.00-43.00**
Rails, Random Lengths	**38.00-40.00**
Rails, 3 ft. and under.	**40.00-42.00**
Angles and Splice Bars	**40.00-42.00**

SAN FRANCISCO

No. 1 Heavy Melt. Steel	$22.00
No. 2 Heavy Melt. Steel	20.00
Nos. 1 & 2 Bundles	18.00
Machine Shop Turnings	12.00

Cast Iron Grades

No. 1 Cupola Cast	25.00-30.00

Railroad Scrap

No. 1 Heavy Melting	22.00
Wheels	22.00
Rails, Random Lengths	22.00

SEATTLE

No. 1 Heavy Melt. Steel	$22.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Busheling	19.50
Nos. 1 & 2 Bundles	18.00
No. 3 Bundles	16.00
Machine Shop Turnings	15.00
Mixed Borings, Turnings	15.00
Punchings & Plate Scrap	30.00
Cut Structurals	30.00

Cast Iron Grades

No. 1 Cupola Cast	25.00-30.00
Heavy Breakable Cast	25.00
Stove Plate	25.00
Unstripped Motor Blocks	25.00
Malleable	25.00
Brake Shoes	25.00
Clean Auto Cast	27.50
No. 1 Wheels	27.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	22.00
Railroad Malleable	22.00
Rails, Random Lengths	22.00
Angles and Splice Bars	20.50

LOS ANGELES

No. 1 Heavy Melt. Steel	$22.00
No. 2 Heavy Melt. Steel	20.00
Nos. 1 & 2 Bundles	18.00
No. 3 Bundles	15.00
Machine Shop Turnings	12.00
Mixed Borings, Turnings	12.50-13.00
Punchings & Plate Scrap	28.00-31.00

Cast Iron Grades

No. 1 Cupola Cast	$28.00-33.00

HAMILTON, ONT.

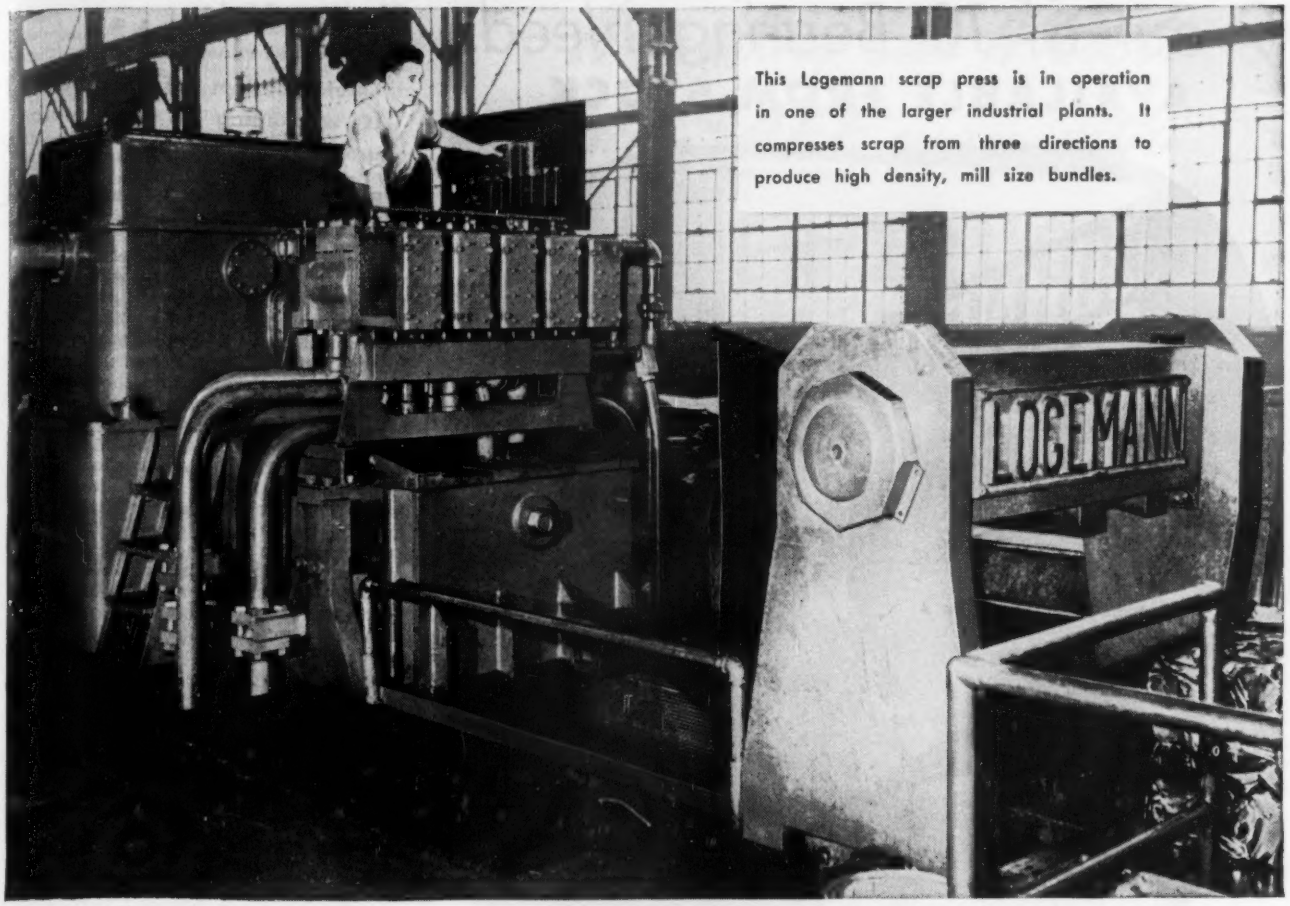
(Ceiling prices, delivered)

Heavy Melt.	$23.00
No. 1 Bundles	23.00
Mechanical Bundles	21.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	23.00
Rails, Rerolling	26.00
Bushelings	17.50
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	48.00
No. 2 Cast	44.00

* Removed from price control Aug. 9, 1947; quoted on basis of f.o.b. shipping point.



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Sheets, Strip . . .

Sheet Prices, Page 128

Quota system of distribution is weakening as competition grows keener

Boston—As competitive selling becomes keener, impact of f.o.b. mill pricing is more apparent. Steel users are more concerned in getting tonnage delivered at lowest cost and certain eastern mills have an advantage on several products, despite higher differentials in some instances. Evidence gathers that consumer quota system is weakening and this method of distribution seems to be on the way out. Consumers are not taking quotas fully in many instances and resale offerings from inventories are appearing. Harder to sell are over-runs and some carbon sheet tonnage, including light gages, has been turned back to mills. Producers also are restoring tonnages to quotas which were cut back earlier this year. Price trend is toward elimination of premiums to meet competition, but quotations are not yet uniform.

New York—While sheet supply continues easier, little or no tonnage is going begging in major grades where it is offered at standard prices. Consumers are placing tonnage as near to their plants as possible so as to save on freight; nevertheless, most are taking in such tonnage as inland mills have to offer and most of the latter have more to supply for the current quarter than they did during the first quarter.

Philadelphia—Easing in sheet supply continues. Eastern producers are now virtually current in most grades, and have more tonnage to offer for the current quarter. Outside producers also are holding out hope of better supply, and some mills are advising old customers that if freight absorption by producers is again given a clean bill of health by Washington, even for the duration of a "moratorium" period, they will give these customers the advantage of it.

Pittsburgh—Recent reduction in zinc quotations will again be reflected in automatic adjustment of coating extras applied to galvanized sheets. Supply of sheets and strip is rapidly catching up with demand. No less than three producers have offered one user sizable sheet tonnage within the past two weeks on a "extra quota" basis. Order cancellations and holdup of shipments are considerably more difficult to place with other customers than in recent past. One producer is shipping hot-rolled sheets via barge to customers in the St. Louis area and has offered additional sheet tonnage on a spot basis to prospective customers in nearby areas. A nonintegrated cold-rolled strip producer in this area recently installed a 36-inch steckel mill, which is now going through initial test runs.

Wallingford Steel Co., Wallingford, Conn., expects to have in operation early in August a new 2-stand, 4-high, 24-inch cold-rolled strip mill, constructed by United Engineering & Foundry Co., Pittsburgh; rated at 500 tons of stainless steel strip monthly.

Detroit—A pronounced softening

has developed in the market for sheets and strip in the so-called "second" class, following the discontinuance by mills of the practice of selling "waster" sheets at practically the same price as prime sheets. In addition, automobile companies are rapidly terminating their purchases of fill-in tonnages, including seconds, inasmuch as they can now obtain their requirements from mills. One warehouse interest here reports that 90 days ago orders were on hand from practically every auto company for material, whereas today this business has evaporated.

Cincinnati—Trend toward an easier supply of sheets continues, but there is still a tight situation in galvanized, hot and cold-rolled, and enameling sheets. Early deliveries are available in aluminized and stainless and some of the other specialties.

Chicago—Decline in demand here for carbon sheets and strip is more pronounced than it is in other steel products. However, tonnage required by some plants is in excess of the amount they have been receiving from suppliers and more than offsets cancellations and deferments reported by mills. District mills are in a quandary over third quarter quotas. Problem is: By mid-May can mills afford rigid quotas for customers, chancing that other mills may be able to offer to fill these customers' needs fully. Developments are in this direction with ex-quota tonnage being offered locally by distant sources.

New coating extras on galvanized sheet products were automatically put into effect by the two local producers on Apr. 6, average decrease being about $1.25 a ton, but ranging from 60 cents to $2.20, depending on gage.

St. Louis—Considerable drop in this area's strip production during the third quarter is portended in Granite City Steel Co.'s announcement its strip mill will be down one of the three months for repairs to the slab mill. Third quarter books, due to open in late April, will be adjusted for that shutdown. Deliveries so far this year have remained on schedule due to customer allocations.

Birmingham—Tennessee Coal, Iron & Railroad Co. has announced a cut in price of galvanized sheets ranging from 80 cents to $5 a ton, depending upon the gages involved. The reduction is the result of lower zinc prices.

Los Angeles—An easier tendency in sheet demand continues, although light gages of cold-rolled and galvanized still are in tight supply. Heavier gages, on the other hand, are becoming more plentiful, with oil drum and water heater fabricators the sources of considerable tonnages of surplus which have reached the market.

San Francisco—Pressure for flat-rolled products continues to ease, and supplies slowly are increasing, partly because of shifting of excess stocks by fabricators. Little, if any, seasonal improvement is being shown in consumer demand.

Ferroalloys . . .

Ferroalloy Prices, Page 131

New York—Vanadium Corp. of America, this city, has reduced the price of Alsifer ¾-cent a pound. The

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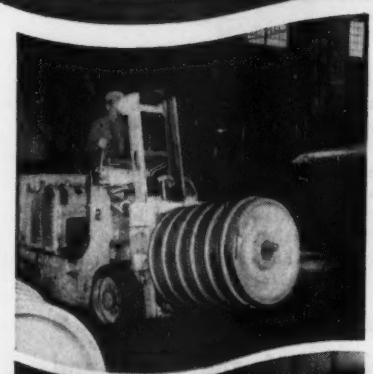

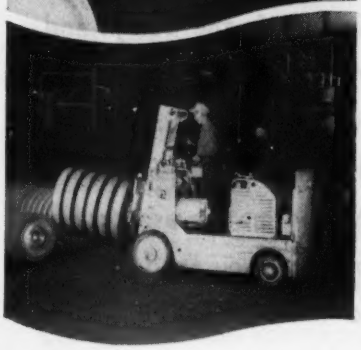

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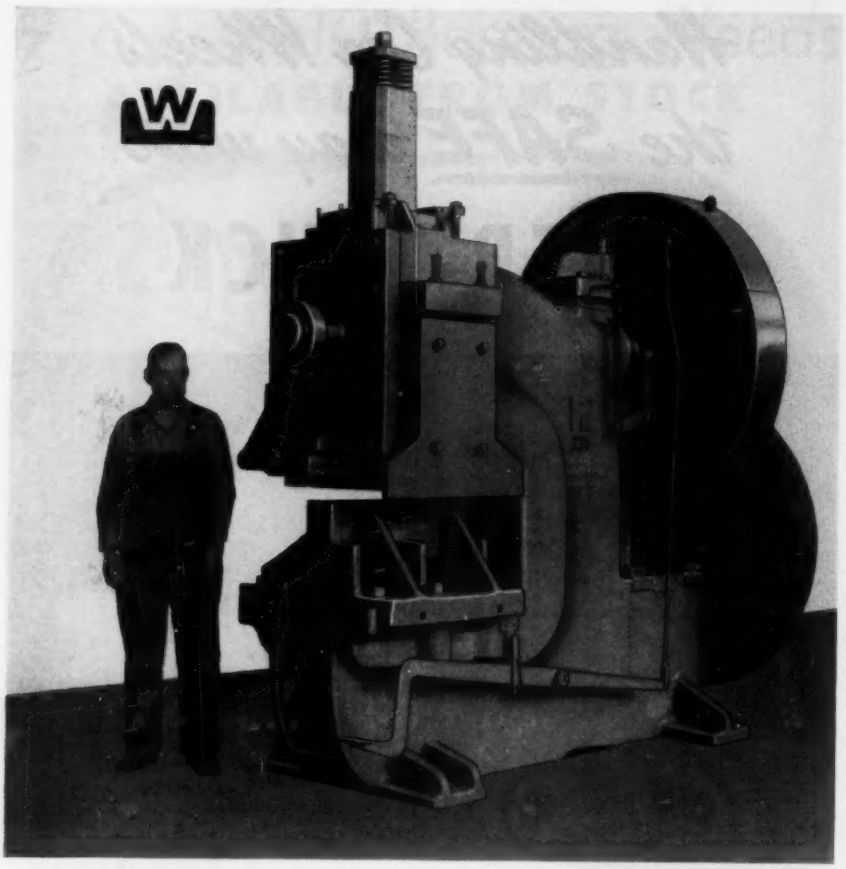

The No. 12, shown above, is representative of a complete line of Bar Shears made by WILLIAMS-WHITE & CO. It will shear rounds up to 3" in diameter and the equivalent in bars, flats or angles. Other sizes can be furnished with capacities from 1¼" to 4" in diameter.

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new prices for this ferroalloy are as follows in cents per pound: Lump carload, bulk, 8.15c; ton lots, packed 9.55c; 200 to 1999 pounds, 9.90c; smaller lots, 10.40c.

Steel Bars . . .

Bar Prices, Page 128

New York—Bar supply is easing but not to a point where it is in balance with demand. This situation may not come for another two or three months. Various consumers are still holding up on commitments, but less of this is being done than a while ago. In fact, there is much to support the contention in some quarters that there is a leveling off in the decline in demand which has been in evidence since early in the year.

Boston—Except for a few sizes of rounds and heavy flats, carbon bar supply more than balances demand. Users are lowering inventory goals, six to eight weeks in some instances, and are limiting new buying to needed sizes and grades. Ex-quota tonnage is available in larger volume. Alloys are slow. Practically every major consuming industry requiring bars has slackened buying, including producers of screw machine products.

Philadelphia—Carbon bar consumers report continued easing in supply and anticipate no particular difficulty in obtaining needs for the current quarter. Some, in fact, are still holding up on shipments, pending an adjustment in inventories. Alloy bars are available within four to six weeks.

Pittsburgh—Further easing in demand for merchant carbon bars is noted, although leading producers have no trouble in rechanneling tonnage canceled or held up by customers. Some producers are offering tonnages to new customers within their logical marketing areas.

St. Louis—Demand for merchant bars here has slipped badly. For the first time in nearly 10 years barmakers are announcing their books on bar orders are "continuously open." There have been a few cancellations, but holdup instructions are numerous. No. 1 soft spot is in freight car demand. Many consumers are holding up bar deliveries pending a better appraisal of the business outlook.

Tubular Goods . . .

Tubular Goods Prices, Page 129

Pittsburgh — Distribution of pipe on consignment basis to jobbers was discontinued by National Tube Co. on Apr. 1. This action was initiated by Republic Steel Corp. last year and was followed eventually by all other sellers. Efforts to obtain semifinished conversion steel for pipe production have declined materially within recent weeks.

Youngstown—Youngstown Sheet & Tube Co. has cut prices of galvanized pipe as a result of recent decline in zinc prices. The cuts range from $1 a ton on small sizes to $3 a ton on large sizes.

Los Angeles — Demand for large pipe has eased somewhat, relieving a little of the pressure under which fabricators have been operating. Small pipe and tubing generally are in adequate supply for all requirements.

Alan Wood Cuts Steel Prices

Conshohocken, Pa. — Alan Wood Steel Co. has cut plates $8 a ton to 3.55c a pound. Gage extra on 3/16-inch gage has been reduced to 20 cents. This producer has made no change in floor plate or low-alloy high-tensile plates, but has reduced low-alloy high-tensile sheets $6 a ton to 4.95c base for 14 gage and heavier and to 4.45c base for 15 and 16 gage material.

Billets have been reduced $5 a net ton to $57 mill on re-rolling; $63 on forging, and $65 on alloy. Hot sheets have been reduced to 3.75c.

Plates . . .

Plate Prices, Page 129

Philadelphia—Competition in plates is becoming increasingly active, with the Claymont, Del., producer cutting prices $6 a ton as of Apr. 6. Due to a decrease in the cost of certain raw materials, this interest made the change to place itself and customers respectively on a more competitive basis with minimum price producers and their customers. On the new basis, carbon plates are now 3.65c per pound, Claymont, and steel going into flange shop products, 3.45c, the drop amounting to $6 a ton in both instances. The latter figure is now in line with the Sparrows Point price of the leading eastern producer. Standard extras will be applicable in all cases. This is the second eastern premium price plate mill to have announced reductions within the past two weeks. The trade anticipates early reductions by two other eastern premium price mills. The Conshohocken, Pa., producer reduced export prices Apr. 5 from 4.82c f.a.s. New York, Philadelphia and Baltimore, to 4.25c f.o.b. Philadelphia only.

New York—While plates are not in easy supply, most consumers likely will be able to obtain third quarter needs. Producers are fast becoming current insofar as arrearages are concerned and with a lessening in requirements for voluntary allocation programs, especially for the railroad program, more tonnage is available for general requirements which at the same time have shrunk as compared with two or three months ago.

Boston—On heavier steel products, plates are still in tightest supply, although there is some easing due in part to lower requirements for voluntary allocation programs. However, less plate tonnage filters into this area due to ability of mills to dispose of tonnage nearer home. While there have been one or two breaks in higher premium prices, quotations are still above so-called standard base and consumers are reluctant to pay these premiums.

Pittsburgh—Sharp reduction in plate requirements for railroad carbuilding program and for other end uses has resulted in openings in mill rolling schedules. Some of these openings are being filled by inquiry received from outside logical marketing areas. Some sellers have been forced to reduce premium quotations on plates.

Seattle—Several major contracts involving plates, for public works

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and industrial projects, have been placed recently in this area.

San Francisco—Strong demand for heavy plates keeps supplies tight and in a "critical" category. Steel men can foresee no easing of this situation.

Structural Shapes . . .

Structural Shape Prices, Page 129

New York—Structural inquiry is featured by a 9000-ton bus terminal for the Port Authority of New York at Eighth Ave. and 41st St., with bids opening Apr. 20. In addition, a few fair sized projects are active, chiefly of public character.

Boston—Tonnage of plain material available to fabricating shops has improved materially, although some new volume carries premiums. Fabricators are buying on a job-to-job requirement basis and are less anxious to obtain steel for inventory. Inquiry and contracts for fabricated structurals are lower with deliveries improved.

Pittsburgh—Structural fabricators' order backlogs have been reduced about 20 to 25 per cent in past two months, reflecting improved steel supply with continued downtrend and new inquiries from private sources. Public work is holding up well and may increase over coming months. Fabricators are offering 2 to 3 months delivery on contracts covering small steel requirements which are largely on hand.

Chicago—Better operating conditions within the fabricating industry have been chiefly responsible for wide adoption of firm prices. Brighter outlook for materials supply, greater worker productivity and in general a more competitive attitude contribute to make the situation more nearly normal. Fabricators say steel stocks are incomplete and they continue to exercise selectivity in bidding on jobs. Small jobs requiring under 100 tons of material are most active.

Los Angeles—Although heavy construction has been slow, and structurals are beginning to glut the market, there are indications that requirements will increase. More interest is being shown in private construction, with larger numbers of projects in or nearing the bid stage. Public construction has maintained comparatively good volume, but there has been a notable dearth of sizable private jobs.

Seattle—Fabricators report that inquiry is equal to a year ago although recent awards have not been heavy. There is a fair demand for small jobs of less than 100 tons each and the total is sufficient to insure normal plant operations. Some sizable tonnages, particularly for military construction in Alaska, are immediately pending.

Wire . . .

Wire Prices, Page 129

Boston—Some wire formers continue to do a good volume of business, due in part to the wide variety of products made. Unless there is an improvement in demand within the next 30 to 40 days, current allocations are expected to mean little. Some wire tonnage under allocation is not

being taken up fully. Round wire, including types required for textile equipment, is slackening. Demand for wire used in the automotive industry is holding up fairly well. Since start of the recent recession, automobile demand has been the main prop in sustaining overall demand. Any slackening would release tonnage from parts-makers and others depending heavily on automobile production.

Cleveland—As a result of increasing cost consciousness among buyers, premium prices on nails are vanishing. One producer, whose quotations had been considerably above most mill prices, now quotes only slightly above most mills and may soon cut prices to the general price level of column 103. Production is still at capacity.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 128

New York—Housing work features the reinforcing bar market. The latest project involves 5000 tons for a 19-story apartment for the New York Life Insurance Co. in Manhattan, with the general contract having been awarded the Cauldwell-Wingate Co. The City Housing Authority has several housing projects in prospect, including the Parkside Houses in the Bronx. Bids recently have been taken on the superstructure involving 1800 tons.

Pittsburgh—Some improvement in concrete reinforcing bar supply is anticipated by early third quarter, reflecting indicated change in product mix among integrated interests as supply and demand come in balance for various steel products. New inquiries continue to include relatively large tonnages for reclamation projects and for public highways.

Dallas — While demand for reinforcing bars is still good in this area, there are definite signs of loosening up in demand and prices are off $3 a ton to most fabricators during the past week. This reduction applies to major suppliers at both Dallas and Houston.

Seattle — Mill estimators are swamped with requests for figures on reinforcing, several large army contracts in Alaska being in abeyance and much work pending in the Columbia Basin. Mills have backlogs for months ahead and are in position to reject undesirable contracts.

February Steel Payroll High

New York—The February payroll of the iron and steel industry, estimated at $189,751,000, was the highest on record for that month and was 13 per cent higher than in February, 1948, according to the American Iron & Steel Institute.

Estimated employment in February set a postwar record of 652,800, an increase of 2600 persons over January, previous high month.

Earnings of hourly, piecework and tonnage workers averaged $1.696 per hour compared with $1.712 in January and $1.551 in February, 1948. These workers averaged 40.1 hours a week in February compared with 38.9 in January.

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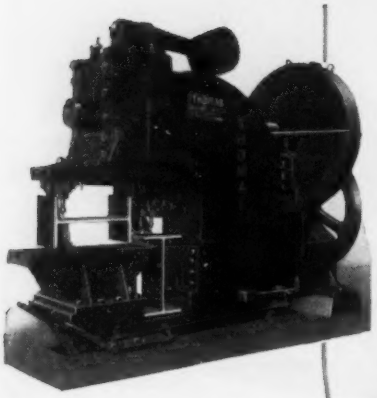

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Semifinished Steel . .

Semifinished Prices, Page 128

Pittsburgh—Supply of semifinished steel for nonintegrated interests, notably ingots and wire rods, has improved substantially. This has eliminated premium priced conversion steel negotiations and is largely responsible for recent sharp reduction in primary steel output by one Pittsburgh mill. This interest has been selling up to 15 per cent of its ingot output because blooming mill capacity has been out of balance with steel producing capacity.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 131

New York—Bolt and nut inquiry is showing more life than in several weeks. Demand is still far from active, but is nevertheless showing some improvement. Whether this is just a flurry or a forerunner of still better inquiry to follow remains a question.

At present, backlogs of most bolt and nut makers average four to six weeks; a year ago these backlogs averaged four to six months.

Most makers report improvement in bar shipments from the mills. Some say that they now have little trouble in getting specifications in six to eight weeks; wire deliveries are a little more extended.

Iron Ore . . .

Iron Ore Prices, Page 130

Cleveland—Activity on the Great Lakes increased rapidly late last month and during the first few days of April. Shipments of Lake Superior iron ore from upper lake ports totaled 1,217,663 gross tons during the week ending Apr. 4 compared with only 37,708 tons for the preceding week which marked the opening of the new season. This brought the cumulative total for the season to Apr. 4 to 1,255,371 tons compared with only 34,482 tons for the like week a year ago. Of this year's total, United States ports accounted for 1,242,546 tons while Canadian ports accounted for only 12,825 tons. Marquette and Port Arthur are the only ports which so far have not reported any shipments.

Pig Iron . . .

Pig Iron Prices, Page 130

Buffalo—With scrap prices continuing to fall, rumblings are heard of a possible cut in pig iron prices. The gap between pig iron and scrap is nearing $20 a ton, while a $4 to $5 difference was considered average in normal periods. Leading merchant iron producers, however, continue to ship total output at prevailing prices, with additional iron moving up the lakes for motor casters.

Cleveland—Sales activity of pig iron producers has increased noticeably. Even those producers which had felt relatively little effect of the decline in foundry demand for iron have now experienced order cancellations and hold-ups in substantial quantity. One producer, whose facilities are integrated with a steel plant, indicated that if demand for

its foundry iron does not keep up with output it will shift some of its blast furnace capacity to production of basic iron.

New York—Pig iron consumers are buying lightly, with some out of the market entirely while working off high-priced inventories, particularly foreign iron. Certain consumers are still working on tonnage acquired at as high as $100 a ton.

Boston—Deliveries are being made against pig iron orders taken months ago during shortages and some shops no longer want this iron. More tonnage is being offered without takers with melt making no recovery. Steelworks furnace iron is included in heavier volume. Decline in melt has been drastic even among larger consumers; one is down to a 32-hour week from three shifts only one quarter back. Consumers' inventories of castings are high, but reserves of iron, while substantial at current operations, would not normally be burdensome. Basic supply has improved with water-canal shipments being made from New York state.

Philadelphia—Pig iron buyers generally are covering only for immediate needs, with buying still quiet. Production has remained heavy, with the Swedeland, Pa., producer establishing an all-time record in March for its larger furnace, a reported average of 913 tons a day. However, most producers are now beginning to stock iron and it is likely that some will take advantage of the present lull to do some relining. One eastern producer is expected to blow out two furnaces for relining in the near future.

Pittsburgh — Anticipated rejuvenation in pig iron demand this spring is counted on to buoy depressed castings production schedules in this district. Much depends on whether or not demand for end products will reduce bulging inventories reported by industry members. Lessening in activity also is reported by some captive foundries, although heavy steel mill equipment interests remain busy.

Lack of demand for merchant basic pig iron is one factor prompting Pittsburgh Steel Co. to blow out its No. 1 blast furnace last week, rated at 650 tons. Carnegie-Illinois Steel Corp. blew in its No. 2 furnace at Clairton Works on Apr. 5, following extensive relining.

Cincinnati—Pig iron needs of district foundries are being met by current shipments. The melt is at a low level, with no improvement shown in recent weeks. Melters shun tonnage which would supplement inventories and, in fact, a few are out of the market until they reduce pig iron stocks.

Chicago—Foundry activity appears to be on the upgrade, a number of patterns having been placed in jobbing shops last week by farm equipment makers and others who had pulled them in during first quarter. Raw materials sellers are convinced they had overloaded the industry at the end of the year and that these inventories now have been pretty well worked off.

Seattle—Foundries report business quiet, the customary spring activity not having appeared. Raw materials are in good supply, inventories of pig

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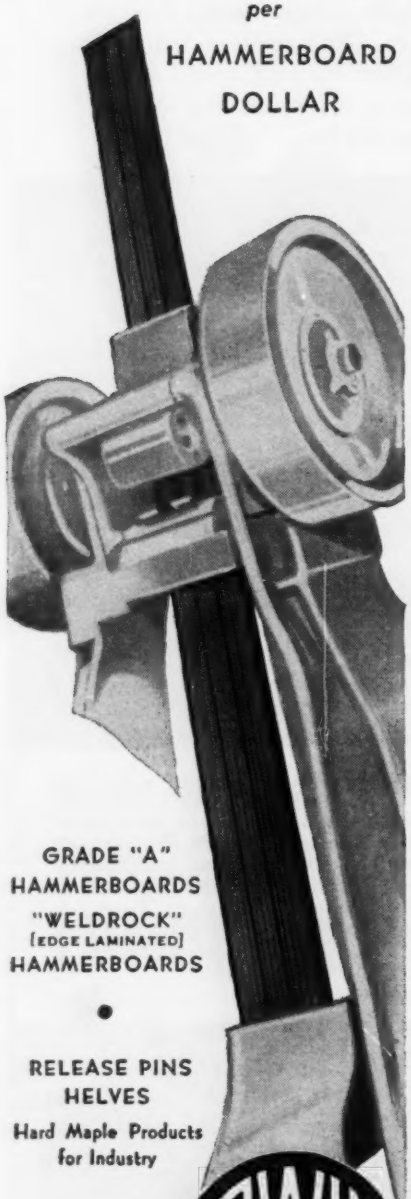

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being sufficient for current needs, while cast iron scrap is available in ample volume. In line with the declining market, foundries have set a maximum price of $30 on No. 1 cupola cast which for several weeks was generally quoted at $32.50.

Silvery Iron Price Reduced

Niagara Falls, N. Y.—Pittsburgh Metallurgical Co. Inc. reduced its electric furnace silvery pig iron price $6.25 per gross ton last week, making its new price for iron of 14.01-14.50 per cent silicon content $78.50 at furnace, Niagara Falls, N. Y.

Premiums Cut on Rails

Chicago — Inland Steel Co., this city, and Colorado Fuel & Iron Corp., Denver, eliminated and reduced, respectively, the premiums previously quoted on standard rails. Inland announced a reduction of 30 cents per 100 pounds in its base price of steel rails to the basis of $3.20, f.o.b. works, Indiana Harbor, Ind., effective Apr. 6.

Colorado Fuel & Iron announced that effective with shipments on and after Apr. 6, the base price on standard rails is decreased 20 cents per 100 pounds to $3.30 per 100 pounds, f.o.b. works, Minnequa, Colo., or to $666 per net ton from $70.

Bethlehem Steel Co., Carnegie-Illinois Steel Corp. and Tennessee Coal, Iron & Railroad Co. continue to quote on the basis of $3.20 per 100 pounds, f.ob. works.

Illinois Central railroad has placed orders for 20,000 tons of rails, divided equally between Inland and Carnegie-Illinois, and is seeking additional material for construction of 90 miles of track.

Rails, Cars . . .

Track Material Prices, Page 129

New York—Domestic freight car deliveries during March totaled 11,882, the American Railway Car Institute announced last week. It was the highest production month since the program calling for 10,000 cars a month was initiated in March, 1947. January production was 10,315 cars. Of March deliveries, 8958 were from the car builders; 2942, from railroad shops.

Orders during March were: To the car builders, 269; railroad shops, 200; total, 469. The backlog of orders as of Apr 1, was: Car builders, 43,826; railroad shops, 29,362; total, 73,188. This compares with 85,974 on Mar. 1 and 126,028 a year ago.

The largest pending list in the East involves 500 gondolas for the Delaware, Lackawanna & Western and this has been long pending, with no early action indicated. Meanwhile, the Chesapeake & Ohio has recently canceled orders for 500 seventy-ton coal cars which had been placed with the American Car & Foundry Co. as a portion of an order, and has also canceled 15 freight locomotives which were part of an order for 25 placed with the Baldwin Locomotive Works, Eddystone, Pa.

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Scrap . . .

Scrap Prices, Page 134

Prices drop sharply in leading districts and approach OPA levels

Pittsburgh—Further sharp drop in scrap quotations developed last week with sale of No. 2 heavy melting dealer scrap within range of $24 to $25, off $6 from preceding week's quotation. Industrial No. 1 heavy melting steel has been contracted for around $27, and low phos at $29.50. One mill purchased No. 1 heavy melting industrial scrap from customers near its plant also at the $25 level. However, these transactions are not representative of the market, with result No. 1 generally is quoted at the recently established $2 differential over No. 2 heavy melting steel. In the absence of any buying, quotations on turnings must be based on brokers' offering prices, which indicate $2 to $3 lower price levels. Cast scrap quotations continue nominal, with market estimated to be $1 lower. Pennsylvania Railroad received $36.50 to $37 for No. 1 heavy melting on latest list. However, this award was based on bids prior to recent sharp reduction in overall price levels. Leading steel producers reportedly are bidding $28 for railroad No. 1 heavy melting on lists which closed last week. Similarly, bids were entered at around $31.50 to $32.50 for railroad specialties, and $39.50 to $40.50 for rails 18 inches and under.

In face of lack of new buying on part of major scrap consuming interests, there are indications the market will be depressed to still lower price levels. No. 1 heavy melting steel currently is about $20 below postwar peak level and only $7 above OPA price ceiling. Future scrap price trend is expected to depend to a large extent on prospective steel production schedules throughout second half this year. Most steel mills have substantial inventories of open-hearth scrap grades even at present capacity production pace. One large interest here, for example, is said to have over 20,000 tons of scrap on hand, which represents nearly two months' supply. This tonnage represents even greater inventory position in respect to number of operating days when constant influx of generated home scrap and customer scrap is taken into consideration. This situation would be further accentuated should steel production decline later this year to the 80-90 per cent range freely predicted by some trade authorities.

Philadelphia—Scrap continues to ease on light trading, with some prices purely nominal. Traders refuse to commit themselves on the question as to how much lower steel scrap prices will go, but venture opinion that cast prices may not decline much further unless there is a drop in standard prices on pig iron.

No. 1 heavy melting steel is now $24-$25, delivered; No. 2 melting steel and No. 1 busheling, $21-$22; No. 1 bundles, $24-$25; No. 2 bundles, $20; machine shop turnings, $16; short shovel turnings, $20-$21; bar crop and plate, punchings and plate

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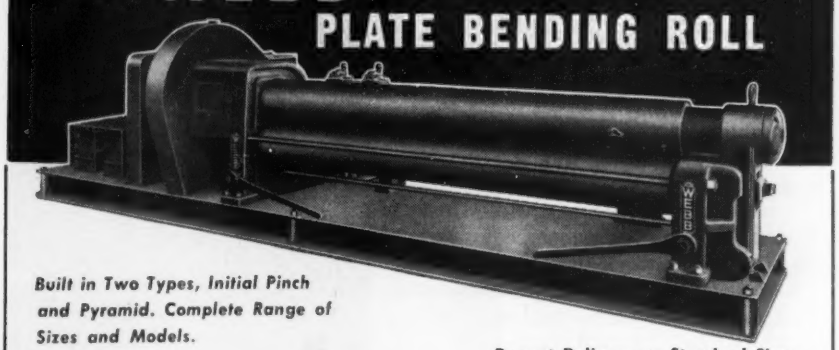

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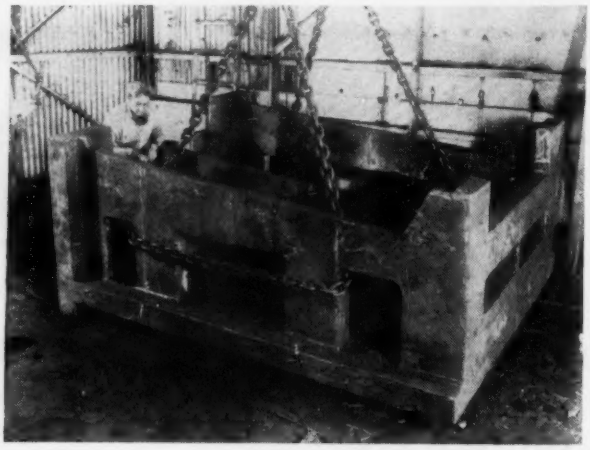

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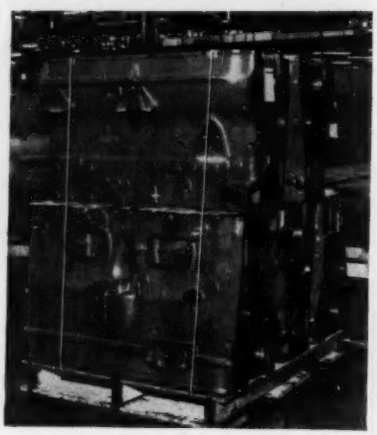

Diesel engine crankcases are palletized for interplant movement. Load weighs 3800 lbs., is firmly secured to the pallet by two Gerrard Steel Straps. Photo courtesy International Harvester Company, Industrial Power Division.

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scrap and cut structurals, $27-$28; electric furnace bundles, $24; and heavy turnings $24-$25.

No. 1 cupola cast is off to $27 on purchases by two pipe foundries. No. 1 machinery cast is lower at $29-$30; charging box and heavy breakable cast, $27-$28; unstripped motor blocks, $24.50; clean auto cast and No. 1 wheels, $29-$30.

New York—Scrap brokers' buying prices have again taken a sharp cut, with consuming demand negligible. Brokers are now offering $18 f.o.b. shipping point, for No. 1 heavy melting; $14-$15 for No. 2 heavy melting and No. 1 busheling; $17-$18 for No. 1 bundles; $15 for No. 2 bundles; $5-$6 for machine shop turnings and mixed borings and turnings; $7-$8 for short shovel turnings; $18-$19 for punchings and plate scrap and electric furnace bundles. No. 1 cupola cast is now $20-$21; No. 1 machine, $21-$22; charging box cast and heavy breakable, $18-$18.50.

Buffalo—Weakness in scrap was further emphasized last week when a leading mill consumer, apparently intent on testing the price structure, placed small orders for approximately 4000 tons of steelmaking grades at prices running roughly $12 to $13 a ton below levels at which previous business took place. Prices, however, were about $4 to $5 below the nominal ranges of the previous week. Dealers' offerings at the sharply reduced prices were far more than the mill cared to cover. The new business carried No. 2 heavy melting down to $22, while No. 2 bundles plunged to $20.

Cleveland—A dull scrap market continued here last week and the lack of buying further depressed quotations, most of which are nominal. Nominal quotation on No. 2 heavy melting steel was $22. Cast iron grades also were not moving and quotations slipped off further to a nominal $35 on No. 1 cupola.

Boston—With buying negligible, scrap prices dropped last week to $17 for No. 1 heavy melting, $14-$14.50 for No. 2, shipping point. Other open hearth grades dropped even more. Cast is also weaker and has sold as low as $25, delivered, for No. 1 machinery. There are potential buyers of cast scrap at current prices, but they are loaded with tonnage for which they paid up to $65 a ton. Unprepared steel scrap is down to $10.50-$11.

Cincinnati — Downturn in scrap prices has not halted, and the demand for some grades is so restricted that current quotations are considered nominal. Borings and turnings are notably weak. The sagging market is also reflected in bids on railroad lists.

Chicago—Becoming more demoralized by the day, scrap traders feel the only thing that would stabilize the market would be re-entrance of district mills with large orders. No such action is in prospect due to heavy mill inventories. Purchase last week of a small tonnage of No. 2 heavy melting steel at $25 was the only reported activity; other quotations are brokers' offering prices and completely lack firmness. A small amount of railroad heavy melting scrap is still taken in under allocation by one mill at a price set at the

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end of last month, but offering price on this material is drastically lower. Absence of foundry purchases and broker-dealer transactions in cast scrap keeps prices nominally unchanged.

Detroit—Buying is confined to scattered purchases of insignificant tonnages. Steel grades are down another $7 to $9 per ton, making No. 1 bundles $20 -$21 at the broker's buying level. Mills remain out of the market, in the frantic effort to consume high-priced inventories. A broad-scale resumption of mill buying could have a bolstering effect, although this is not expected for another month. A decrease of another $3 per ton will bring steel scrap down to the OPA figure.

St. Louis—Brokers' offering prices on scrap in this district slid again last week with No. 2 melting steel quotations dropping $4 to $25-$26; No. 1, off $1 to $30-$31. Drop was attributed to offerings of distress supplies from other districts, which obliged local dealers to meet that figure. Mills, with scrap inventories around 60 days, generally remain out of the market although one purchased a month's supply at the $26 level. Foundry stocks also are good considering their prevailing short week, with the result there is no buying, which sent cast prices down $1 to $2 last week.

Dallas — Scrap dealers are more confused than ever over the market trend and they are not optimistic. Activity is at a virtual standstill with committments being fulfilled on a $34 Pittsburgh basis price. They doubt they could get that for additional orders. They have no orders beyond Apr. 15 delivery. Some yards are planning on trying to stabilize prices around old OPA prices, which were $14 a ton gross, Dallas, but with freight rates approximating that figure dealers are none to hopeful.

Los Angeles—Prices have dropped sharply, with all grades of steelmaking scrap off from $3 to as much as $5 per ton. Foundry material has weakened with No. 1 cupola cast down $2 per ton. In the general reduction, the traditional price differential was re-established between Nos. 1 and 2 heavy melting steel. Re-establishment is another evidence of increasing selectivity by mill buyers. No. 1 now is quoted at $22, off $3 per ton, while No. 2 is $20, down $5.

San Francisco—Scrap prices have dropped sharply here. Mills now are buying No. 1 heavy melting at $22 a ton, off $3 from the price established late in February, and No. 2 heavy melting has dropped to $20 from $25. No. 1 and 2 bundles are down $5 a ton to $18 and machine shop turnings have dropped to $12 from $15 a ton. Cupola cast iron continues to sag and is now being offered at $25 to $30 a ton. All mills have shifted the price basis from f.o.b. shipping point, to "delivered at the mill". Thus the reductions just announced do not reflect the full amount of the cut. Mills also are not quoting offering prices on the following grades: No. 1 bushelling, No. 3 bundles, bar crops and plate, cast steel, alloy free turnings and cut structurals. Mills also indicated purchases of railroad scrap will be made at the No. 1 heavy melting price rather than at premium

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prices previously offered. All mills have good inventories and indicate they will continue to buy scrap cautiously and selectively.

Seattle—Mills lowered scrap prices from $2 to $5 effective Apr. 1 the following being announced as the new scale: No. 1 heavy melting charging box size, $22; No. 2 heavy melting, prepared, $20; No. 1 and No. 2 bundles, $18; No. 1 railroad heavy melting $22; No. 1 cupola cast iron, $25 maximum. Supplies are coming in freely and the lower price level has not retarded shippers.

Warehouse . . .

Warehouse Prices, Page 131

Cincinnati—Warehouse prices are showing narrower variations in reflection of the approach to a competitive market. Demand is still in volume to absorb all steel available in most grades. However, secondary material is becoming increasingly hard to move.

Chicago—Forthcoming action on galvanized sheet prices by district warehouses which had not previously announced new schedules was delayed last week when zinc price again dropped. New inquiry for warehouse tonnage was off last week on all products, although demand for flat-rolled carbon steel is in excess of supply. Sheets are moving more rapidly into balance than other scarce items. Heavy plate continues as the most desperately needed warehouse item. Some transfer of demand for structurals from warehouses to mills has been noticed, but distributors still are unable to balance inventories. Carbon bars in most sizes are available.

Philadelphia—Business was generally disappointing to jobbers in March. While some distributors reported a slight improvement over February, others were unable to do so, and on a day-to-day basis, trading was down from the preceding month. Warehouse stocks are in better shape, although some distributors still complain of a shortage in bar shapes, structurals and plates, and point out that it will probably be some time before inventories are anything like normal. They have a surplus on various items which will take some time for them to work off, or reduce to a level in balance with other items—material which customers are no longer willing to accept as substitutions.

Dallas—Warehouse supplies are coming into better balance steadily, but increased supplies were reflected in no important price changes the past week here. Buying continues spotty and is based on short term needs. In the critical list, only plates showed some easement in supply.

Los Angeles—Steel jobbers are becoming more selective in their requirements as inventories continue to improve. Demand by warehouse customers for sheets with the exception of galvanized, has receded slightly. Surplus inventories offered by fabricators are helping jobbers balance their stocks, although the pace of such liquidation has slowed.

San Francisco — Gradual adjustment of inventories continues. Demand still exceeds supplies of flat-rolled items, but almost all other products are "ample" or "available."

Seattle — Warehouse business is slow compared with a year ago, but in comparison with 1939-40 it is exceedingly satisfactory. Current pick-up is not active, volume being spotty. Sheets and plates are no easier and continue in critical shortage. Jobbers are unable to round out stocks as they find some items missing. Allocations are not helping the situation. Nails and wires, now in fair supply, have been reduced in price an average of 91 cents per cwt.

Export Quotas Increased

Washington—Increases in second quarter 1949 export quotas for eight iron and steel wire and sheet metal products were announced last week by the Office of International Trade, Department of Commerce.

Export quotas for all iron and steel products for the second quarter were first announced early in February. OIT explained that current supplies of the wire and sheets products are easing sufficiently to permit an incerase in allowable exports. The quota increases made by this action range from 2500 to 5000 tons.

The revised quotas are as follows:

Commodity	2nd Qtr. From (Net tons)	1949 Quota To (Net tons)
Electrical Sheet	13,000	18,000
H.R. Strip Band & Hoop	16,500	20,500
Wire, uncoated	19,000	22,000
Wire, galvanized	20,000	24,000
Wire, barbed	15,000	17,500
Woven wire fencing	4,800	Open-end
Nails, wire; and nails, unspecified	7,500	10,000

OIT emphasized that no more than a total of 5000 tons of transformer grade electrical sheet will be licensed and that all requests for roofing and galvanized siding nails will be severely screened.

Procedure for filing export license applications for woven wire fencing, for which no tonnage limitation was set, will be announced shortly. No applications should be filed under this open-end quota until the procedure is announced, OIT stated.

Steel Demand Varies Widely

St. Louis—With steel demand beginning to vary rather widely, mills here are both "reaching out" and "staying home" in their sales policies, depending on their product. For example, sheet makers are making no effort to extend beyond their wartime territory, claiming that local demand is still far from satisfied. But a leading maker of bars, rods and wire is trying to ship anyplace he can pick up some freight. A pipemaker currently is staying closely within his territory, but foresees a policy before long of fanning out his sales force.

Castings Firm Sees Good Volume

GENERAL Steel Castings Corp. has thus far experienced only a slight decline from its peak peacetime volume and expects no sharp drop.

Shipments of castings are holding at 5000 tons monthly now, but will fall about June to around 4000 tons. The curtailment will come at the Commonwealth plant in Granite City, Ill., where practically all General's railroad specialty work is done. About 2000 tons monthly will be produced there by June.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2685 tons, Veterans Administration hospital, Indianapolis, reportedly to R. C. Mahon Co., Detroit; J. L. Simmon & Co., general contractor.

2500 tons, Twin City generating station, Minneapolis, for Northern States Power Co., to Bethlehem Steel Co.

2400 tons, Mississippi river bridge, Hastings, Minn., to Clinton Bridge Co. for fabrication by Allied Structural Steel Cos., Chicago.

1350 tons, Washington state Agate Pass bridge, to American Bridge Co., Pittsburgh; Manson Construction & Engineering Co., Seattle, general contractor.

1200 tons, field house, Kansas State University, Manhattan, Kans., to Allied Structural Steel Cos., Chicago.

850 tons, Yellowstone river Montana state bridge, to Pittsburgh-Des Moines Steel Co., Des Moines; W. P. Roscoe, Billings, Mont., general contract.

600 tons, tunnel ribs, Garrison dam, N. Dakota, to Commercial Shearing & Stamping Co., Chicago.

570 tons, bridge, spec. FI-53-9, Yellowstone county, Montana, reportedly to Pittsburgh-Des Moines Steel Co., Pittsburgh.

470 tons, high school, Hinsdale, Ill., to Allied Structural Steel Cos., Chicago.

405 tons, four-span rolled beam bridge over New Haven Railroad, Springfield branch, North Meadows expressway, Hartford, Conn., to Bethlehem Steel Co.; Blakeslee Construction Co., New Haven, general contractor.

370 tons, service building, Chicago Transit Authority, to Joseph T. Ryerson & Son Inc., Chicago; Joseph J. Duffy Co., Chicago, general contractor.

310 tons, trestle, Lake Andes reservoir, S. Dakota, reportedly to Lakeside Bridge & Steel Co., Milwaukee, through Western Contracting Corp., Sioux City, Iowa.

280 tons, three-span plate girder bridge over New Haven Railroad, Williamanic branch, North Meadows expressway, Hartford, Conn., to Electric Boat Co., Groton, Conn.; Blakeslee Construction Co., New Haven, general contractor.

185 tons, diesel shop, 39th & St. Louis Sts., Chicago, Santa Fe Railroad, to Hansell-Elcock Co., Chicago.

170 tons, building, Illinois Institute of Technology, Chicago, to Wendnagel & Co., Chicago.

120 tons, deodorizing building, Kraft Food Co., to Joseph T. Ryerson & Son Inc., Chicago; Cambell - Lowrie - Lautermilch Corp., Chicago, general contractor.

STRUCTURAL STEEL PENDING

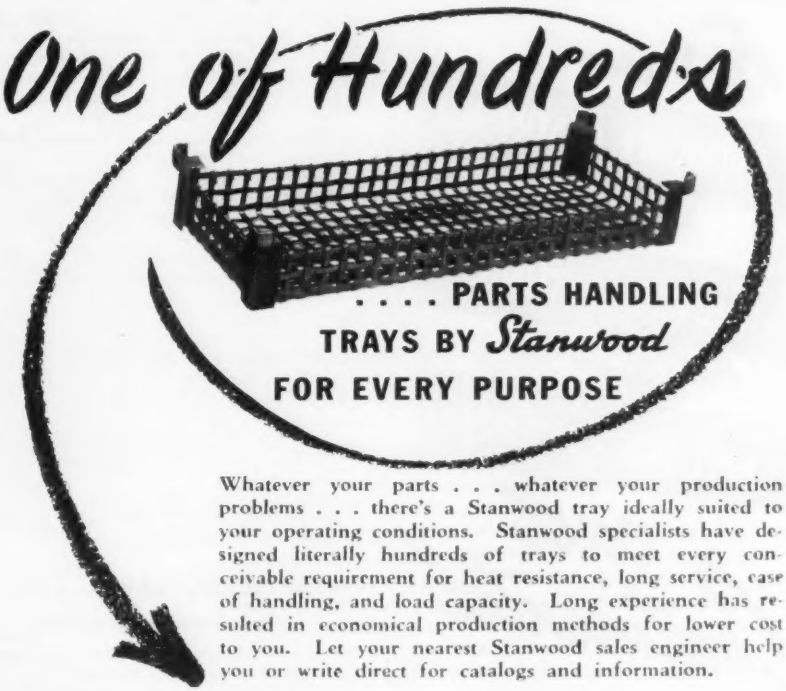
15,000 tons, Penrose Ave. bridge (a state project) Philadelphia; bids Apr. 29.

9000 tons, bus terminal, Port Authority of New York, at Eighth Ave. and 41st St., New York; bids Apr. 20.

2000 tons, four state bridges, Vermont; legislature voting on bond issue.

1425 tons, Bergen Pines County Hospital, Paramus, N. J.; Harris Structural Steel Co., New York, low bidder.

800 tons, Major Deegan expressway, a state



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project, Bronx, New York; no bids submitted, as contractors apparently estimated their prices would exceed the appropriation.

800 tons, science building No. 1, Queens College, New York; T. G. K. Construction Co., that city, low on general contract.

700 tons, textile plant, New London, Conn.; project rebid; Fletcher-Thompson, Bridgeport, engineers.

430 tons, state turnpike bridge, section 24A, Lebanon and Lancaster counties, Pennsylvania; bids Apr. 26.

350 tons, state bridge, Goshen, N. Y.; A. E. Ottaviano, Croton-on-Hudson, N. Y., low on general contract.

250 tons, also 70 tons H-piling, enginering shop building, city of Seattle; general contract to Brazier Construction Co., Seattle.

240 tons, including 65 tons steel grill flooring, Wishkah river swing bridge; bids to Aberdeen, Wash., Apr. 20.

100 tons, towers and bus structure, Seattle city light; Pacific Car & Foundry Co., Seattle, low.

100 tons, or more, eight 60-foot steel girders for Touchet river bridge; bids to Walla Walla county, Washington, Apr. 11.

REINFORCING BARS . . .

REINFORCING BARS PLACED

100 tons, St. Joseph hospital, Bellingham, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle; General Construction Co., Seattle, general contract.

REINFORCING BARS PENDING

5000 tons, 19-story apartment, New York Life Insurance Co., between Second and Third Aves. and 65th and 66th Sts., Manhattan, New York; general contract awarded to the Cauldwell-Wingate Co., that city.

3150 tons, Schedules Nos. 1 and 2, North dam and feeder canal, Columbia Basin project; J. A. Terteling & Sons, Boise, Idaho, low $1,988,716.

1800 tons, superstructure, Parkside Houses for the City Housing Authority, Bronx, New York; S. S. Silberblatt Inc., low on general construction.

500 tons, Winchester wasteway, Columbia Basin; bids to Bureau of Reclamation, about Apr. 28.

400 tons, Washington state Agate Pass bridge; general contract to Manson Const. & Engr. Co., Seattle.

100 tons, Washington state highway projects; bids to Olympia, Apr. 15.

Unstated, hignway bridge, King county, Washington; bids in at Seattle, Apr. 4.

PLATES . . .

PLATES PLACED

5000 tons, 12-foot diameter pipe, Coulee pump house, furnished by Consolidated Western Steel Corp., Los Angeles, for Bureau of Reclamation.

2500 tons, four 13 feet 6 inch diameter penstocks, for Hungry Horse dam, Montana, to Chicago Bridge & Iron Co., Chicago, low $699,200.

2100 tons, additional oil storage for Standard Oil Co., at Richmond Beach, Wash., to Chicago Bridge & Iron Co., Chicago; job being completed.

700 tons, oil storage expansion, Willbridge terminal, Portland, Oreg., to Western Consolidated Steel Corp., Los Angeles, by Union Oil Co.

500 tons or more, three 8 foot diameter outlet pipes, for Hungry Horse dam, Montana, to Pacific Coast Engineering Co., Alameda, Cal., low $211,200.

300 tons, sheet piling, Agate Pass bridge, Washington state, to Bethlehem Pacific Coast Steel Corp., Seattle; Manson Construction & Engrg. Co., Seattle, general contract.

250 tons, two-million gallon water reservoir, Elkhart, Ind., to Graver Tank & Mfg. Co., East Chicago, Ind.

130 tons, elevated oil storage tanks, for Alaska Railroad, Fairbanks, to Chicago Bridge & Iron Co., Chicago.

PLATES PENDING

400 to 800 tons, oil storage tanks for U. S. engineers, Whittier, Alaska; bids in April.

350 tons, penstocks Gorge powerhouse, Seattle light project; American Pipe & Construction Co., Portland, Oreg., low, to Guy P. Atkinson Co., general contract.

CONSTRUCTION AND ENTERPRISE

ALABAMA

TUSCALOOSA, ALA.—Logan-Long Co., c/o contractor, has awarded a $200,000 contract to Morgan-Holloman Construction Co., for construction of a roofing manufacturing plant; Donald A. Hawkins, architect.

ARKANSAS

PINE BLUFF, ARK.—Pinecrest Cotton Mills, c/o Hardy & Schumaker, 410 Scarritt Arcade Bldg., Kansas City, Mo., has awarded a $3 million contract to Universal Construction Co., Scarritt Bldg., Kansas City, for construction of a factory.

CALIFORNIA

IRVINE, CALIF.—Irvine Bean & Grain Growers has awarded a $200,000 contract to Gridley Construction Co., Box 649, Oxnard, Calif., for construction of a storage plant; Moffatt & Nichol, 122 W. Fifth St., Long Beach, Calif., engineer.

LOS ANGELES—Board of Public Works has awarded a $1,151,672 contract to Newbery Electric Corp. for installation of a power and light distribution system at the Hyperion sewage treatment plant.

NILES, CALIF.—Pacific States Steel Corp. will build a $175,000 furnace building.

CONNECTICUT

HAMDEN, CONN.—High Standard Mfg. Co., 1817 Dixwell Ave., has awarded a contract for $400,000 to Smith Construction Co. Inc., 101 Water St., Darby, Conn., for construction of a factory.

FLORIDA

FT. PIERCE, FLA.—Florida East Coast Railroad, c/o contractor, has awarded a $68,000 contract to Cleary Bros., West Palm Beach, Fla., for construction of a diesel engine inspection pit and plant.

TAMPA, FLA.—Tampa Electric Co., Tampa and Cass Sts., has awarded a $570,000 contract to Stone & Webster Engineering Corp., 49 Federal St., Boston, for construction of a plant.

GEORGIA

CHAMBLEE, GA.—American Hospital Supply Corp., 199 Marietta St., Atlanta, will build a $250,000 plant.

IDAHO

MOSCOW, IDAHO—University of Idaho plans early call for bids for $2½ million building program to include student union hall, agricultural science and engineering college structures.

ILLINOIS

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CHICAGO—Belden Mfg. Co., 4647 W. Van

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Production lost while chilly employees cluster around a salamander soon pays for Dravo *Counterflo* Heaters for your foundry. Keep working-area warm—keep men at work.

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